GENERAL MECHANICAL NOTES

GENERAL

1. WHEN A CONFLICT BETWEEN THE DRAWINGS, NOTES AND/OR SPECIFICATIONS OCCUR, THE MORE STRINGENT, AND/OR LARGER QUANTITY AND/OR MORE EXPENSIVE SHALL APPLY. THE REQUIREMENTS LISTED WITHIN NOTES OR SPECIFICATIONS SHALL BE REQUIRED, PROVIDED AND INSTALLED WHETHER SPECIFICALLY INDICATED ON THE DRAWINGS OR NOT.
2. IT IS THE INTENTION OF THE SPECIFICATIONS AND DRAWINGS TO PROVIDE FOR FINISHED WORK, TESTED AND READY FOR OPERATION.
3. ITEMS AND SERVICES NOT SHOWN ON DRAWINGS OR SPECIFICATIONS BUT REQUIRED TO RENDER THE WORK COMPLETE AND READY FOR OPERATION, SHALL BE PROVIDED WITHOUT ADDITIONAL COST.
4. WORK OF THIS SECTION SHALL BE GOVERNED BY THE CONTRACT DOCUMENTS. PROVIDE MATERIALS, LABOR, EQUIPMENT AND SERVICES NECESSARY TO FURNISH, DELIVER AND INSTALL ALL WORK AS SPECIFIED AND AS REQUIRED BY JOB CONDITIONS. WHERE A CONFLICT EXISTS BETWEEN THESE NOTES, THE DRAWINGS AND THE SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT SHALL APPLY.
5. DRAWINGS ARE DIAGRAMMATIC AND INDICATE A GENERAL ARRANGEMENT OF WORK AND ARE NOT TO BE CONSIDERED SUB-CONTRACTOR DOCUMENTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND ALL SUBCONTRACTORS TO INCLUDE THE PROVISIONS AND INSTALLATION OF ALL NECESSARY WORK AND MATERIALS FOR COMPLETE, OPERATIONAL AND CODE COMPLIANT SYSTEMS. GENERAL DESIGN CONCEPTS INDICATED MUST BE FOLLOWED OR BETTERED. THE BID SHALL INCLUDE OFFSETS, ADDITIONAL PIPING, VALVES AND EQUIPMENT AND COMPONENTS AS REQUIRED TO MEET CONSTRUCTION CONDITIONS FOR PROPER OPERATION. DO NOT SCALE DRAWINGS. CONSULT ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR SPACE CONDITIONS AND ADDITIONAL REQUIREMENTS.
6. PERFORM THE WORK IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT GENERAL CONDITIONS AND WITH THE PROVISIONS OF ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES AND LAWS.
7. WORK SHALL INCLUDE ALL INCIDENTALS, LABOR, MATERIAL, EQUIPMENT, APPLIANCES, SERVICES, HOISTING, SCAFFOLDING, SUPPORTS, TOOLS, CONSUMABLE ITEMS, FEES, LICENSES, AND ADMINISTRATIVE TASKS REQUIRED TO COMPLETE AND MAKE OPERABLE WORK SHOWN ON THE DRAWINGS, SPECIFIED HEREIN AND AS REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM.
8. STORE MATERIALS INSIDE AND PROTECTED FROM DEBRIS, WEATHER AND MOISTURE.
9. THIS CONTRACTOR SHALL PROVIDE AND INSTALL ALL POWER AND CONTROL WIRING REQUIRED FOR EQUIPMENT OPERATION NOT SPECIFICALLY PROVIDED BY OTHERS BUT REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. THIS CONTRACTOR SHALL PROVIDE MOTOR STARTERS. COORDINATE REQUIREMENTS WITH DIVISION 26.
10. COORDINATE ALL HVAC WORK AND EQUIPMENT WITH STRUCTURAL STEEL, FIRE PROTECTION PIPING, PLUMBING PIPING, LIGHT FIXTURES, ELECTRICAL EQUIPMENT AND OWNER'S EQUIPMENT.
11. ALL EXISTING CONDITIONS AS INDICATED ARE APPROXIMATIONS OF EXACT CONDITIONS TO BE VERIFIED IN THE FIELD. CONTRACTOR SHALL VISIT THE SITE TO VERIFY THE CONSTRUCTION CONDITIONS BEFORE SUBMITTING BID.
12. WHENEVER THE DOCUMENTS INDICATE FOR NEW PIPING TO CONNECT TO AN EXISTING PIPING SYSTEM (OTHER THAN A STEAM SYSTEM), CONTRACTOR SHALL INSTALL A TEMPORARY CORROSION INHIBITOR SYSTEM TO TREAT THE EXISTING PIPING. THE SYSTEM SHALL CONSIST OF AN INJECTOR, PIPING MODIFICATIONS AND APPLICABLE CHEMICALS REQUIRED TO TREAT THE EXISTING SYSTEM FOR A MINIMUM OF THREE WEEKS PRIOR TO ANY NEW CONNECTIONS. UPON INSTALLATION OF THE NEW PIPING SYSTEM, THE ENTIRE SYSTEM (NEW & EXISTING) SHALL BE FLUSHED WITH A CHEMICAL CLEANSING AGENT.
13. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF ALL CEILING GRILLES, REGISTERS AND DIFFUSERS.
14. PROVIDE VOLUME DAMPERS IN EACH BRANCH DUCTWORK SERVING REGISTERS, GRILLES AND DIFFUSERS WHETHER INDICATED OR NOT.
15. PROVIDE CABLE OPERATED DAMPERS IN BRANCH DUCTWORK SERVING REGISTERS, GRILLES, AND DIFFUSERS IN INACCESSIBLE CEILING LOCATIONS WHETHER INDICATED OR NOT.
16. LOCATE ALL BALANCING DAMPERS AT MAIN DUCTWORK ABOVE ACCESSIBLE CEILINGS, OR PROVIDE ACCESS DOORS.
17. PROVIDE TRAPPED CONDENSATION DRAIN PIPING FROM COOLING COIL DRAIN PAN TO AN APPROVED POINT OF DISCHARGE WHETHER INDICATED OR NOT. REFER TO PLUMBING PLANS FOR FLOOR DRAIN LOCATIONS.
18. RUN REFRIGERATION PIPING FROM AIR COOLED CONDENSING UNITS TO RESPECTIVE DX COOLING COILS. ROUTE AND SIZE PIPING PER EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.
19. ALL HWS AND HWR PIPING SERVING RADIATION SHALL BE CONCEALED IN WALLS OR FLOORS UNLESS OTHERWISE NOTED.
20. PROVIDE FIRE DAMPERS, SMOKE DAMPERS AND COMBINATION FIRE/SMOKE DAMPERS AS REQUIRED TO MAINTAIN WALL & FLOOR RATINGS AS DEFINED IN ARCHITECTURAL DRAWINGS.
21. PROVIDE PITCH CORRECTION CURBS FOR ALL MECHANICAL EQUIPMENT AS REQUIRED. ROOF MOUNTED EQUIPMENT TO BE INSTALLED PLUMB AND LEVEL ACCORDING TO EQUIPMENT MANUFACTURERS INSTALLATION INSTRUCTIONS.
22. PROVIDE STAINLESS STEEL DRIP PANS WITH LEAK DETECTION FOR ALL SUSPENDED EQUIPMENT WITH COOLING COILS. LEAK DETECTION ALARM TO ALERT TO BMS.
23. PROVIDE SEISMIC EXPANSION JOINTS AT ALL PIPING AND DUCTWORK PASSING THROUGH SEISMIC EXPANSION JOINTS.
24. REFER TO SPECIFICATION SECTION 230000 AND DIVISION 7 FOR ADDITIONAL PENETRATION SEALING REQUIREMENTS. PENETRATIONS TO COMPLY WITH ASTM E84 & E814 AND APPROVED UL 1479 AND SPECIFIC UL ASSEMBLIES AS REQUIRED TO SUIT PENETRATION CONDITIONS.
25. LOCATE ALL ROOF MOUNTED EQUIPMENT REQUIRING SERVICE A MINIMUM OF 10'-0" FROM EDGE OF ROOF. CONTRACTOR MUST COMPLY W/ THIS SET BACK.
26. DO NOT RUN ANY MECHANICAL OR CONTROL SERVICES THROUGH RATED STAIR ENCLOSURES UNLESS SYSTEMS ARE DESIGNED AND DESIGNATED TO SERVICE STAIRS.
27. COORDINATE ALL ROOF AND FLOOR PENETRATIONS W/ STRUCTURAL DWGS AND PROVIDE STRUCTURAL CONTRACTOR W/ FLOOR, WALL & ROOF OPENING SIZES.
28. TEMPERATURE CONTROL CONTRACTOR (TCC) IS RESPONSIBLE FOR ALL CONTROL WIRING 120 VOLT AND LESS. EXTEND POWER FOR VAV BOXES FROM JUNCTION BOXES PROVIDED BY DIVISION 26. REFER TO ELECTRICAL DRAWINGS FOR LOCATIONS. TCC TO EXTEND 120V POWER TO EACH VAV BOX TRANSFORMER,SHARED TRANSFORMERS ARE NOT ALLOWED. RUN POWER PER DIVISION 26 REQUIREMENTS.
29. TCC SHALL EXTEND ALL POWER FOR DAMPER ACTUATORS, VALVE ACTUATORS AND OTHER CONTROL DEVICES FROM LOCAL ELECTRICAL PANEL. DIVISION 26 TO SUPPLY POWER TO TCPS. REFER TO ELECTRICAL DRAWINGS FOR PANEL LOCATIONS.
30. CONTROL CONTRACTOR TO FIELD MOUNT CONTROL ACTUATORS AND CONTROLS FOR VAV BOXES.
31. THE DRAWINGS AND SPECIFICATIONS ARE DIVIDED INTO SECTIONS TO MEET THE NEEDS OF THE ARCHITECT, THE ENGINEERS, AND THE DESIGN CONSULTANTS. THEY ARE NOT PREPARED AS INSTRUCTIONS TO THE CONTRACTOR FOR HOW TO BUY OUT OR SUBCONTRACT THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR ALL THE WORK DESCRIBED IN THE CONTRACT DOCUMENTS, REGARDLESS OF WHERE IT IS SHOWN. FOR EXAMPLE, ELECTRICAL WORK IS SHOWN ON FP-SERIES DRAWINGS AS WELL AS ON M-SERIES DRAWINGS AND E-SERIES DRAWINGS. MISCELLANEOUS METALS AND STRUCTURAL ELEMENTS ARE SHOWN ON A-SERIES DRAWINGS AS WELL AS ON S-SERIES DRAWINGS. STRUCTURAL SUPPORTS ARE REQUIRED BY THE FP DRAWINGS, TO AVOID OMITTING ANY COMPONENT OF THE PROJECT, REFER TO ALL THE CONTRACT DOCUMENTS IN THEIR ENTIRETY.
32. CONTRACTOR TO PROVIDE INTERNAL MIXING BAFFLES IN AIR HANDLING UNITS, PLENUMS AND FAN COILS TO ALLOW PROPER MIXING OF OUTSIDE AIR AND RETURN AIR IN THE EVENT THERE IS INSUFFICIENT SPACE FOR MIXING TO PREVENT NUISANCE FREEZE STAT TRIPS. CONTRACTOR REVIEW DRAWING AND INSTALLATION AND PROVIDE BAFFLES AS REQUIRED.
33. WHEREVER EXISTING SYSTEMS ARE ALTERED OR EXTENDED THE INTEGRITY OF THE SYSTEM IS TO BE MAINTAINED AND FUNCTION FULLY AS BEFORE. COORDINATE SCHEDULE FOR HOOK-UPS TO EXISTING SYSTEMS AND EQUIPMENT REMOVAL OR RELOCATION WITH THE OWNER AND PERFORM THIS WORK AT SUCH TIMES TO ENSURE THAT PERIODS OF SHUTDOWN WILL BE ACCEPTABLE TO THE OWNER.
34. VERIFY EXACT LOCATION OF CONNECTION POINTS (NEW TO EXISTING) IN FIELD PRIOR TO CONSTRUCTION.
35. RELOCATE EXISTING DUCTWORK AND/OR PIPE WORK IN EXISTING CEILING SPACES TO ACCOMMODATE ALL RENOVATIONS AND ADDITIONS.
36. TAKE DOWN AND REINSTALL EXISTING CEILINGS IN ALL AREAS WHERE MECHANICAL WORK IS INDICATED AND EXISTING CEILINGS REMAIN. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN DRAWINGS FOR LOCATIONS WHERE EXISTING CEILINGS REMAIN. REPLACE CEILING TILES DAMAGED DURING WORK.
37. PATCH ALL WALLS, FLOORS, CEILINGS, AND ROOFS TO MATCH EXISTING IN ALL CASES WHERE EXISTING WALLS, FLOORS, CEILINGS, AND ROOFS REMAIN AND HVAC DEMOLITION IS INDICATED.
38. THIS PROJECT CONSISTS OF MULTIPLE PHASES OF CONSTRUCTION OVER A SPECIFIED TIME PERIOD. PROVIDE ALL WORK NECESSARY TO KEEP EXISTING SYSTEMS IN SAFE OPERATION. PROVIDE ISOLATION (SHUTOFF) VALVES AT ALL CONNECTION POINTS TO EXISTING SYSTEMS.

ALTERATION WORK AND DEMOLITION

1. ALL EQUIPMENT, DUCTWORK, PIPING, CONTROL DEVICES, ETC. TO BE REMOVED, SHALL BE DISPOSED OF, TURNED OVER TO THE OWNER, OR SALVAGED AS DIRECTED BY THE OWNER. EQUIPMENT, DUCTWORK, PIPING, CONTROL DEVICES, ETC. SHALL NOT BE REMOVED FROM THE PREMISES WITHOUT THE OWNER'S APPROVAL.
2. UPON COMPLETION OF REMOVALS AND MODIFICATIONS, ALL DUCTWORK AND PIPING TO REMAIN SHALL BE PROPERLY VALVED, CAPPED AND/OR BY PASSED SUCH THAT UPON COMPLETION OF WORK ALL SYSTEMS TO REMAIN, REMAIN OPERATIONAL.
3. NO DEAD ENDS SHALL BE LEFT ON ANY DUCTWORK OR PIPING SYSTEM UPON COMPLETION OF WORK.
4. EXISTING DUCTWORK AND PIPING SYSTEMS NOT TO BE REUSED, AND NOT SPECIFICALLY NOTED FOR REMOVAL SHALL BE COMPLETELY REMOVED.
5. ALL SYSTEMS SHALL BE LEFT IN WORKING ORDER TO THE SATISFACTION OF THE OWNER UPON COMPLETION OF ALL NEW WORK.
6. ALL EXISTING UNNECESSARY DUCTWORK AND PIPING NOT RELATED TO NEW WORK SHALL BE COMPLETELY REMOVED.
7. RE-ROUTE ALL EXISTING DUCTWORK, PIPING AND SYSTEMS WHERE NECESSARY TO AVOID NEW EQUIPMENT, STRUCTURAL, OR MASONRY WORK AS REQUIRED BY THE PROPOSED ALTERATIONS.
8. WHERE PORTIONS OF EXISTING DUCT SYSTEMS ARE TO REMAIN CONTRACTOR SHALL TAKE AIRFLOW READINGS AT ALL AIR REGISTER, GRILLES AND DIFFUSERS ASSOCIATED WITH THE DUCT SYSTEM TO BE MODIFIED BEFORE COMMENCEMENT OF WORK AND AFTER ALTERATION WORK IS COMPLETE. AIR BALANCING WORK SHALL BE PERFORMED BY AN INDEPENDENT NEEB CERTIFIED COMPANY, NOT ASSOCIATED WITH THE CONTRACTOR. REPORTS ARE TO BE ISSUED TO THE OWNER AND ENGINEER AT BOTH OCCURRENCES. IF AS-BUILTS ARE AVAILABLE, DISCREPANCIES NOTED BETWEEN THE AS BUILT DRAWINGS AND THE INITIAL AIR FLOW READINGS ARE TO BE NOTED ON THE AIR FLOW REPORT. EXISTING AIR REGISTERS, GRILLES AND DIFFUSERS ARE TO BE BALANCED TO THE ORIGINAL READINGS AT COMPLETION OF WORK UNLESS OTHERWISE IDENTIFIED.

SHOP DRAWINGS

1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO BE REVIEWED BY THE ENGINEER PRIOR TO CONSTRUCTION, SHOP DRAWINGS SHALL BE SUBMITTED FOR DUCTWORK LAYOUT, PIPING LAYOUT, SHEET METAL SHOP STANDARDS AND ALL EQUIPMENT FURNISHED.
2. ELECTRONIC DRAWING FILES SHALL BE GENERATED BY THE CONTRACTOR. DRAWINGS SHALL BE SUBMITTED IN BOTH HARD COPY AND ELECTRONIC VERSION (AUTOCAD VERSION AS REQUIRED BY THE OWNER) OR AUTOCAD VERSION 2010 IF NOT SPECIFIED.
3. PRIOR TO THE SUBMISSION AND REVIEW OF SHEET METAL SHOP DRAWINGS, THE CONTRACTOR SHALL SUBMIT FOR REVIEW SHEET METAL SHOP STANDARDS. ANY SHEET METAL SHOP DRAWINGS SUBMITTED PRIOR TO THE SUBMISSION OF THE SHOP STANDARDS SHALL BE RETURNED "NOT REVIEWED".

COORDINATION DRAWINGS

1. ELECTRONIC DRAWING FILES SHALL BE GENERATED BY THE CONTRACTOR. IF REQUESTED, ELECTRONIC FILES OF THE MECHANICAL FLOOR PLANS, SECTIONS AND ELEVATIONS ONLY WILL BE MADE AVAILABLE. ELECTRONIC FILES WILL BE RELEASED ONLY UPON RECEIPT OF THE SIGNED AGREEMENT FOR TRANSFER OF ELECTRONIC FILE DATA, AGREEMENT FOR TRANSFER OF BUILDING INFORMATION MODEL AND ALL FEES INDICATED THEREIN.
2. DEVELOP AND SUBMIT COORDINATION DRAWINGS AS OUTLINED.
   A. SHEET METAL, PLUMBING AND FIRE PROTECTION SHOP DRAWINGS THAT HAVE BEEN COORDINATED WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW. DRAWINGS MUST BE RETURNED FROM ENGINEER EITHER "REVIEWED" OR "FURNISH AS CORRECTED" PRIOR TO BEING USED AS BASIS FOR COORDINATION DRAWINGS.
   B. AFTER SHEET METAL AND PIPING DRAWINGS HAVE BEEN REVISED PER ENGINEERS COMMENTS, REPRODUCIBLE COPIES SHALL BE SENT TO THE TRADES IN THE FOLLOWING SEQUENCE FOR THE INCLUSION OF THEIR WORK:
      -MECHANICAL SHEET METAL
      -PLUMBING PIPING
      -MECHANICAL PIPING
      -SPRINKLER PIPING
      -ELECTRICAL WORK
3. AFTER ALL TRADES HAVE INCLUDED THEIR WORK ON THE COORDINATION DRAWING AND NOTED CONFLICTS, ALL TRADES SHALL MEET TO RESOLVE CONFLICTS AND AGREE TO ACCEPTABLE SOLUTIONS. EACH TRADE SHALL SIGN COORDINATION DRAWINGS. ITEMS NOT SHOWN ON COORDINATION DRAWING IS RESPONSIBILITY OF OMITTING CONTRACTOR AND CONTRACTOR IS SUBJECT TO ADDITIONAL COSTS INCURRED BY OTHER TRADES.
4. THE ARCHITECT AND ENGINEER ARE NOT PART OF THE COORDINATION DRAWING PROCESS. THE ENGINEER WILL PROVIDE ASSISTANCE FOR NOTED CONFLICTS ONLY. COORDINATION DRAWINGS ARE NOT TO BE CONSIDERED PIPING OR DUCT SHOP DRAWINGS. THE CONTRACTOR IS REQUIRED TO SUBMIT INDIVIDUAL PIPING AND DUCTWORK SHOP DRAWINGS FOR REVIEW BY THE ENGINEER. PIPING AND DUCTWORK SHOP DRAWINGS SHALL FOLLOW THE DESIGN INTENT OF THE CONTRACT DOCUMENTS.
5. SUBMIT FINAL SIGNED COORDINATION DRAWING TO ENGINEER FOR REVIEW. ENGINEER WILL REVIEW COORDINATION DRAWINGS FOR GENERAL ARRANGEMENT AND FOR NOTED CONFLICTS ONLY. SPECIFIC INSTALLATION REQUIREMENTS WILL BE REVIEWED ONLY IN INDIVIDUAL TRADE SHOP DRAWINGS.
6. ANY WORK FABRICATED OR INSTALLED PRIOR TO SIGN OFF BY ALL TRADES WHICH IS DEEMED TO BE IN CONFLICT WITH COORDINATION DRAWINGS SHALL BE REMOVED AND RE-INSTALLED IN CONFORMANCE WITH COORDINATION DRAWINGS.
7. EACH CONTRACTOR (MENTIONED ABOVE) IS RESPONSIBLE FOR THE COORDINATION OF HIS SUB-CONTRACTORS.
8. THE OVERALL COORDINATION OF THE COORDINATION PROCESS IS THE RESPONSIBILITY OF THE CONTRACTOR, THE ENGINEER IS NOT RESPONSIBLE FOR THE COORDINATION PROCESS. THE ENGINEER WILL RESPOND TO QUESTIONS THAT ARISE FROM THE COORDINATION PROCESS. DRAWINGS SUBMITTED WILL BE REVIEWED FOR CLEARLY IDENTIFIED CONFLICTS ONLY. SOLUTIONS TO CONFLICTS WILL NOT BEAR ADDITIONAL COST.

AS BUILT DRAWINGS

1. PROVIDE A COMPLETE SET OF AS-BUILT DRAWINGS REFLECTING AS INSTALLED CONDITIONS. AS-BUILT DRAWINGS SHALL INDICATE ALL INSTALLED CONDITIONS OF SYSTEMS WITHIN THIS DISCIPLINE. DRAWINGS SHALL BE OF SIMILAR SCALE AS THE CONSTRUCTION DOCUMENTS AND INCLUDE DETAILS AS NECESSARY TO CLEARLY REFLECT THE INSTALLED CONDITION. DRAWINGS SHALL BE BOUND IN A COMPLETE AND CONSECUTIVE SET. SUPPLEMENTAL SKETCHES AND LOOSE PAPERWORK WILL NOT BE ACCEPTABLE AND WILL BE RETURNED FOR REVISION. THE CONTRACTOR SHALL COMPLY WITH THE ENGINEERS COMMENTS TO PRODUCE A CLEAR AND CONCISE SET OF DRAWINGS. DRAWINGS SHALL BE SUBMITTED IN BOTH HARD COPY AND ELECTRONIC VERSION (AUTO-CAD VERSION AS REQUIRED BY THE OWNER) OR AUTOCAD VERSION 2010 IF NOT SPECIFIED. NUMBER OF COPIES OF EACH AS REQUESTED BY THE OWNER.
2. PROVIDE "AS-BUILT DRAWINGS" INDICATING IN A NEAT AND ACCURATE MANNER A COMPLETE RECORD OF ALL REVISIONS OF THE ORIGINAL DESIGN OF THE WORK. INDICATE THE FOLLOWING INSTALLED CONDITIONS:
   - INCLUDE ALL CHANGES AND AN ACCURATE RECORD IN AUTOCAD DRAWING OR APPROPRIATE SHOP DRAWINGS, OF ALL DEVIATIONS, BETWEEN THE WORK SHOWN AND WORK INSTALLED.
   - MAINS AND BRANCHES OF PIPING SYSTEMS, WITH VALVES AND CONTROL DEVICES LOCATED AND NUMBERED, CONCEALED UNIONS LOCATED, AND WITH ITEMS REQUIRING MAINTENANCE LOCATED (I.E., TRAPS, STRAINERS, EXPANSION COMPENSATORS, TANKS, ETC.). VALVE LOCATION DIAGRAMS, COMPLETE WITH VALVE TAG CHART.
   - EQUIPMENT LOCATIONS (EXPOSED AND CONCEALED), DIMENSIONED FROM PROMINENT BUILDING LINES.
   - APPROVED SUBSTITUTIONS, CONTRACT MODIFICATIONS, AND ACTUAL EQUIPMENT AND MATERIALS INSTALLED.
   - CONTRACT MODIFICATIONS, ACTUAL EQUIPMENT AND MATERIALS INSTALLED.
3. SUBMIT FOR REVIEW BOUND SETS OF THE REQUIRED DRAWINGS, MANUALS AND OPERATING INSTRUCTIONS.
4. SUBMIT A COMPLETE MAINTENANCE MANUAL OF ALL EQUIPMENT INSTALLED UNDER THIS CONTRACT.

HANGERS AND SUPPORT

1. SEISMIC RESTRAINT: PROVIDE SEISMIC RESTRAINT AND EXPANSION OF ALL MECHANICAL EQUIPMENT AND SYSTEMS IN ACCORDANCE WITH STATE AND FEDERAL BUILDING CODE REQUIREMENTS. SUBMIT SHOP DRAWINGS SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF THE PROJECT INDICATING ALL NECESSARY COMPONENT CUTS, PLAN LOCATIONS AND CALCULATIONS FOR A COMPLETE SYSTEM.
2. PROVIDE ALL NECESSARY STRUCTURAL MEMBERS INCLUDING ADDITIONAL STRUCTURAL SUPPORT TO SUPPORT PIPING AND EQUIPMENT. HANGERS AND SUPPORTS SHALL BE OF AN APPROVED DESIGN NECESSARY TO SUPPORT DUCTWORK, PIPING, EQUIPMENT AND TO KEEP IN PROPER ALIGNMENT AND PREVENT TRANSMISSION OF INJURIOUS THRUSTS AND VIBRATIONS. IN ALL CASES WHERE HANGERS, BRACKETS, ETC., ARE SUPPORTED FROM CONCRETE CONSTRUCTION, DO NOT WEAKEN CONCRETE OR PENETRATE WATERPROOFING. ALL HANGERS AND SUPPORTS SHALL BE CAPABLE OF SCREW ADJUSTMENT AFTER EQUIPMENT AND PIPING IS ERECTED. HANGERS SUPPORTING PIPING EXPANDING INTO LOOPS, BENDS AND OFFSETS SHALL BE SECURED TO THE BUILDING STRUCTURE IN SUCH A MANNER THAT HORIZONTAL ADJUSTMENT PERPENDICULAR TO THE RUN OF PIPING SUPPORTED MAY BE MADE TO ACCOMMODATE DISPLACEMENT DUE TO EXPANSION. ALL SUCH HANGERS SHALL BE FINALLY ADJUSTED BOTH IN THE VERTICAL AND HORIZONTAL DIRECTION, AS REQUIRED. HANGERS IN CONTACT WITH COPPER OR BRASS PIPE SHALL BE DIELECTRIC, COMPATIBLE WITH COPPER AND BRASS ALLOY OR PROVIDED WITH FELT SLEEVE.
3. PROVIDE ADDITIONAL SUPPORT FOR DUCTWORK PIPING AND EQUIPMENT WHEN DECK IS NOT CAPABLE OF SUPPORT.
4. BEAM CLAMPS - HANGERS SUPPORTED FROM STEEL SHALL BE CENTER LOADING BEAM CLAMPS FOR HANGERS SUPPORTING PIPING 2 INCHES. FOR PIPING 2-1/2 INCHES AND LARGER, I BEAM CLAMPS SHALL BE FORGED STEEL. "C" CLAMPS ARE NOT TO BE USED.
5. PROVIDE AND INSTALL EXPANSION COMPENSATION FOR ALL PIPING. SUBMIT PLANS, CALCULATIONS AND EQUIPMENT DATA.

MECHANICAL DRAWING LIST

DRAWING NUMBER	DRAWING DESCRIPTION
M-001	COVER SHEET - MECHANICAL
M-002	SYMBOLS & ABBREVIATIONS - MECHANICAL
MD-102	PARTIAL SECOND FLOOR DEMO PLAN - MECHANICAL
M-102	PARTIAL FLOOR PLAN - MECHANICAL
M-201	SCHEDULES - MECHANICAL
M-202	SCHEDULES - MECHANICAL
M-301	DETAILS - MECHANICAL
M-401	SPECIFICATIONS - MECHANICAL

MECHANICAL DEMOLITION NOTES

1. COORDINATE PHASING OF DEMOLITION WITH C.M./G.C. AND PROPOSED CONSTRUCTION SCHEDULE TO MAINTAIN MECHANICAL SERVICES (HEATING, TEMPERATURE CONTROLS, EXHAUSTS, MAKE UP AIR ETC.) TO OCCUPIED AREAS OF THE BUILDING DURING CONSTRUCTION.
2. THE EXISTING FACILITY WILL BE OCCUPIED AND IN OPERATION DURING THE PERFORMANCE OF THE WORK.
3. WHEN NECESSARY TO TEMPORARILY DISCONNECT ANY EXISTING PIPING OR DUCTWORK WHICH MAY CAUSE DISRUPTION TO OCCUPIED FACILITIES, CONFER WITH THE OWNER, AND SCHEDULE A MUTUALLY AGREEABLE PERIOD OF INTERRUPTION.
4. WHERE REPLACEMENT, RELOCATION OR MODIFICATION OF EXISTING EQUIPMENT IS INDICATED, PROVIDE AND MAINTAIN ALL TEMPORARY SERVICES, CONNECTIONS, CONTROLS, AND ANY OTHER MATERIALS AND APPURTENANCES REQUIRED TO MAINTAIN SERVICES TO OCCUPIED AREAS.
5. NO WORK SHALL BE LEFT INCOMPLETE, NOR ANY HAZARDOUS SITUATION CREATED, WHICH WILL AFFECT THE LIFE OR SAFETY OF THE PUBLIC AND/OR BUILDING OCCUPANTS. AT NO TIME SHALL THE WORK INTERFERE WITH OR CUT OFF ANY OF THE EXISTING SERVICES WITHOUT THE OWNER'S PRIOR WRITTEN PERMISSION.
6. THE OWNER RESERVES THE RIGHT TO OPERATE ALL EXISTING MECHANICAL EQUIPMENT UNTIL THE NEW SYSTEMS COME ON LINE.
7. IT IS REQUIRED THAT THE WORK INDICATED AND/OR SPECIFIED SHALL BE CARRIED OUT WITH A MINIMUM OF INTERFERENCE TO THE ESTABLISHED OPERATIONS OF THE BUILDING.
8. REMOVED MATERIALS SHALL BE DISPOSED OF USING LICENSED CARTING SERVICE.
9. HAZARDOUS MATERIALS - SHALL BE DISPOSED OF BY AN EPA APPROVED, LICENSED DISPOSAL SERVICE. CONTRACTOR SHALL OBTAIN AND HAVE ON FILE, AFFIDAVIT, AND RECEIPTS STATING HOW AND WHERE THE WASTE WAS DISPOSED OF OR CONVERTED.
10. IT IS THE INTENTION OF THESE DEMO DRAWINGS TO INDICATE GENERAL SYSTEMS AND MATERIALS TO BE REMOVED. CONTRACTOR SHALL REMOVE ALL OBSOLETE PIPING, DUCTWORK, EQUIPMENT, CONTROLS, ETC, INDICATED OR NOT.
11. DUCTWORK, EQUIPMENT AND TERMINAL DEVICES HAVE BEEN TAKEN FROM FIELD OBSERVATION AND ARE TO BE USED FOR REFERENCE AND SHALL NOT BE CONSTRUED TO BE ACTUAL FIELD CONDITIONS. CONTRACTOR IS RESPONSIBLE TO VERIFY ALL SYSTEMS PRIOR TO COMMENCEMENT OF DEMOLITION WORK.
12. ALL EQUIPMENT TO BE REMOVED SHALL BE DISPOSED OF PER OR STORED PER DIRECTION OF OWNER. ANY ITEM NOT RETAINED BY OWNER SHALL BE REMOVED FROM SITE AND DISCARDED IN AN APPROVED MANNER.
13. IT IS THE INTENTION OF THESE SPECIFICATION TO REMOVE ALL MATERIALS ABANDONED BY THE SCOPE OF THIS CONSTRUCTION PROJECT. NO OBSOLETE MATERIALS (I.E. HANGERS, SUPPORTS, INSULATION, DUCTWORK, ETC.) SHALL REMAIN.
14. DISCONNECT AND REMOVE ALL DUCTWORK AND ASSOCIATED SUPPLY, RETURN OR EXHAUST GRILLES INCLUDING BUT NOT LIMITED TO ALL HANGERS, SUPPORTS, VOLUME DAMPERS AND FLEXIBLE DUCTWORK.
15. CONTRACTOR SHALL PROVIDE TEMPORARY PROTECTION TO ANY EXPOSED OR UNCAPPED NEW OR EXISTING DUCTWORK TO REMAIN TO MINIMIZE DUST CONTAMINATION IN ANY AND ALL OF THE AIR SYSTEMS. THIS SHALL INCLUDE BUT IS NOT LIMITED TO TEMPORARY FILTERS, CAPS, ENCLOSURES, ETC.

Central Connecticut State University

1615 Stanley Street
New Britain, CT 06050

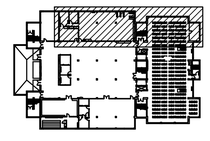
REVISIONS

NUMBER	DATE	DESCRIPTION

OakPark Architects LLC
312 Park Rd, W. Hartford, CT (860)232-6664

KOHLER RONAN, LLC CONSULTING ENGINEERS
93 Lake Avenue, Danbury, CT 06810
203.778.1017 F 203.778.1018
171 Madison Avenue,
New York, NY 10016
212.695.2422 F 212.695.2423
www.kohlerronan.com
E-mail krce@kohlerronan.com

MEDIA CENTER RELOCATION TO ELIHU BURRITT LIBRARY



KEY PLAN
NOT TO SCALE

N W E S

CCSU PROJECT No.:	22-87
DPW PROJECT No.:	BI-RC-397
DRAWN BY:	FMD
DATE:	6/14/2016
CAD FILE:	

COVER SHEET - MECHANICAL

BUILDING No.:	DRAWING No.:
22	M-001

GENERAL MECHANICAL SYMBOLS

- CHS — CHILLED WATER SUPPLY PIPING
- CHR — CHILLED WATER RETURN PIPING
- DTS — DUAL TEMPERATURE WATER SUPPLY PIPING
- DTR — DUAL TEMPERATURE WATER RETURN PIPING
- HWS — HOT WATER SUPPLY PIPING
- HWR — HOT WATER RETURN PIPING
- CD — CONDENSATE DRAIN PIPING
- HIDDEN PIPING
- EXISTING PIPING/EQUIPMENT TO REMAIN
- EXISTING PIPING/EQUIPMENT TO BE REMOVED
- DIRECTION OF FLOW IN PIPE
- PITCH PIPE DOWN IN DIRECTION OF ARROW
- PIPE ELBOW UP / DOWN
- PIPE TOP CONNECTION
- PIPE BOTTOM CONNECTION
- CAPPED PIPING
- PIPING CONTINUATION
- POINT OF CONNECTION
- POINT OF DEMOLITION
- OC — OCCUPANCY SENSOR
- CO — CARBON MONOXIDE SENSOR
- CO_2 — CARBON DIOXIDE SENSOR
- XXX — UNDERLINED TEXT DENOTES EQUIPMENT REFER TO SCHEDULES
- LTR / CFM-# — DIFFUSER LEGEND
  LTR= TYPE DESIGNATION, REFER TO SCHEDULES
  CFM= CFM QUANTITY
  #= BLOW ARRANGEMENT, 4-WAY BLOW IS TYPICAL UNLESS OTHERWISE NOTED
  3= 3-WAY BLOW
  2= 2-WAY BLOW
  1= 1-WAY BLOW
- VFD — VARIABLE FREQUENCY DRIVE
- MS — COMBINATION MOTOR STARTER/DISCONNECT
- TCP — TEMPERATURE CONTROL PANEL

- EXISTING DUCTWORK TO REMAIN
- EXISTING DUCTWORK TO BE REMOVED
- HIDDEN DUCTWORK
- SUPPLY DUCT UP / DN
- RETURN AIR DUCT UP / DN
- EXHAUST AIR DUCT UP / DN
- 24x12 — DOUBLE LINE DUCTWORK WITH INDICATION OF INSIDE DIMENSIONS
- 24x12 — DOUBLE LINE DUCTWORK WITH INTERNAL ACOUSTICAL INSULATION AND INDICATION OF INSIDE DIMENSIONS
- 24x12 — DOUBLE LINE DUCTWORK WITH DUCT LAGGING AND INDICATION OF INSIDE DIMENSIONS
- ACCESS DOOR IN DUCT
- 12"Ø — ROUND DUCT DIAMETER SIZE
- FLEXIBLE DUCT CONNECTION
- UNDERCUT DOOR
- SUPPLY AIR FLOW
- EXHAUST/RETURN AIR FLOW
- 90° ELBOW WITH AIRFOIL TURNING VANES
- DUCT TAKE-OFF
- VANE EXTRACTOR
- CEILING DIFFUSER REFER TO SCHEDULE FOR SIZE & TYPE
- RETURN / EXHAUST GRILLE REFER TO SCHEDULE FOR SIZE & TYPE
- LINEAR DIFFUSER REFER TO SCHEDULE FOR SIZE & TYPE
- T — THERMOSTAT
- TS — TEMPERATURE SENSOR
- H — RELATIVE HUMIDITY SENSOR OR HUMIDISTAT
- S — SMOKE DETECTOR IN DUCT
- SP — STATIC PRESSURE SENSOR
- SD — SMOKE DAMPER
- FD — FIRE DAMPER
- FSD — COMBINATION SMOKE & FIRE DAMPER
- MD — MOTORIZED DAMPER
- VD — MANUAL VOLUME DAMPER/CABLE OPERATED DAMPER (COD)

* ALL SYMBOLS MAY NOT BE USED IN THESE DOCUMENTS.

GENERAL MECHANICAL ABBREVIATIONS

ABV	ABOVE	FA	FACE AREA	NTS	NOT TO SCALE
AC	AIR COMPRESSOR	FC	FORWARD CURVE	OA	OUTSIDE AIR
ACC-#	AIR COOLED CONDENSER	F.C.	FLEX CONNECTION	OAT	OUTDOOR AIR TEMPERATURE
ACU-#	AIR CONDITIONING UNIT	FC-#	FAN COIL	OAI	OUTDOOR AIR INTAKE
ACCU-#	AIR COOLED CONDENSING UNIT	FCU-#	FAN COIL UNIT	OBD	OPPOSED BLADE DAMPER
AD	ACCESS DOOR	FD	FIRE DAMPER WITH ACCESS DOOR	OD	OUTSIDE DIMENSION
AF	AIRFOIL	FF	FINAL FILTER	O.E. T.D.	OPEN END TRANSFER DUCT
AFC	ADJUSTABLE FREQUENCY CONTROLLER	FIN FL	FINISH FLOOR	OED	OPEN END DUCT
AFF	ABOVE FINISHED FLOOR	FL	FLOOR	P-#	PUMP
AFMS	AIR FLOW MEASURING STATION	FLA	FULL LOAD AMPERES	PB	PUSH BUTTON
AHU-#	AIR HANDLING UNIT	FLEX	FLEXIBLE	PBD	PARALLEL BLADE DAMPER
AL	ACOUSTIC LINING	FO	FLAT OVAL	PD	PRESSURE DROP
ALD	AUTOMATIC LOUVER DAMPER	FPF	FINS PER FOOT	PF	PREFILTER
ALP	ACOUSTICALLY LINED PLENUM	FT	FEET	PH	PHASE
APD	AIR PRESSURE DROP	F.T.	FLOAT & THERMOSTATIC TRAP	PHC	PREHEAT COIL
AUTO	AUTOMATIC	FT-#	FIN TUBE RADIATION	PPH	POUND PER HOUR
B-#	BOILER	FV	FACE VELOCITY	PRV	PRESSURE REDUCING VALVE
BC	BACKWARD CURVED	GC	GENERAL CONTRACTOR	PSI	POUND PER SQUARE INCH
BD	BYPASS DAMPER	GIH	GRAVITY INTAKE HOOD	RA	RETURN AIR
BMCS	BUILDING MANAGEMENT & CONTROL SYSTEM	GPH	GALLONS PER HOUR	RAD	RETURN AIR DAMPER
BTU	BRITISH THERMAL UNIT	GPM	GALLONS PER MINUTE	RAF-#	RETURN AIR FAN
BV	BYPASS VALVE	H/C	HEATING/COOLING	RAT	RETURN AIR TEMPERATURE
CH-#	CHILLER	H-#	HUMEDIFIER	REG	REGISTER
CHR	CHILLED WATER RETURN	H-O-A	HAND-OFF-AUTOMATIC	RH	RELATIVE HUMIDITY
CHS	CHILLED WATER SUPPLY	HC-#	HEATING COIL	RHC	REHEAT COIL
CAP	CAPACITY	HD	FEET OF HEAD	RLA	RATED LOAD AMPERES
CB-#	CONTROL BOX	HP	HORSEPOWER	RM	ROOM
CC-#	COOLING COIL	HTG	HEATING	RP	RELIEF PENTHOUSE
CD	CEILING DIFFUSER	HTR	HEATER	RPM	REVOLUTIONS PER MINUTE
CFM	CUBIC FEET PER MINUTE	HV-#	HEATING AND VENTILATING UNIT	RTU-#	ROOFTOP AIR CONDITIONING UNIT
CG	CEILING GRILLE	HVAC	HEATING, VENTILATING & AIR CONDITIONING	RV	RADIATION VALVE
CLG	CEILING	HX-#	HEAT EXCHANGER CONVERTOR	SA	SUPPLY AIR
C-#	CONVECTOR	IBT	INVERTED BUCKET TRAP	SAF-#	SUPPLY AIR FAN
C.O.D.	CABLE OPERATED DAMPER	ID	INSIDE DIMENSION	SAT	SUPPLY AIR TEMPERATURE
CP	CONDENSATE RECEIVER/PUMPING SYSTEM	IN	INCHES	SB	SECURITY BARS
CR	CEILING REGISTER	IP	INTAKE PENTHOUSE	VSC	VERTICAL SPLIT CASE
CT-#	COOLING TOWER	IV	INLET GUIDE VANES	HSC	HORIZONTAL SPLIT CASE
CTD	CEILING TRANSFER DUCT	KW	KILOWATT	SD	SMOKE DAMPER
CUH-#	CABINET UNIT HEATER	KWH	KILOWATT HOUR	SG	SUPPLY GRILLE
CV	CONTROL VALVE	IL	INLINE	SP	STATIC PRESSURE
D&T	DRIP AND TRAP	LAT	LEAVING AIR TEMPERATURE	SQ.FT	SQUARE FOOT (AREA)
DB	DRY BULB	LD	LINEAR DIFFUSER	ST	SINGLE POLE SWITCH
DD	DIRECT DRIVE	LIN	LINEAR	T'STAT	THERMOSTAT
DDC	DIRECT DIGITAL CONTROL	LRA	LOCKED ROTOR AMPERES	TB	TERMINAL BOX
DIFF	DIFFUSER	LPR	LOW PRESSURE RETURN	TCP	TEMPERATURE CONTROL PANEL
DL	DOOR LOUVER	LPS	LOW PRESSURE SUPPLY	TD	TEMPERATURE DIFFERENCE
DN	DOWN	LVG	LEAVING	TEMP	TEMPERATURE
DP	DEWPOINT TEMPERATURE	LWT	LEAVING WATER TEMPERATURE	TG	AIR TRANSFER GRILLE
DR	DROP	MAN	MANUAL	TOT	TOTAL
DX	DIRECT EXPANSION	MAT	MIXED AIR TEMPERATURE	TN-HR	TON HOUR REFRIGERATION
EF-#	EXHAUST FAN	MAX	MAXIMUM	TR	TOP REGISTER
EAT	ENTERING AIR TEMPERATURE	MBH	1000 BTU'S	TRD	TRANSFER DUCT
EER	ENERGY EFFICIENCY RATIO	MCA	MINIMUM CIRCUIT AMPACITY	TT	THERMOSTATIC TRAP
EG	EXHAUST GRILLE	MD	MOTORIZED DAMPER	TYP	TYPICAL
EHC-#	ELECTRIC HEATING COIL	MER	MECHANICAL EQUIPMENT ROOM	UC	UNDERCUT DOOR
ENT	ENTERING	MEZZ	MEZZANINE	UH-#	UNIT HEATER HOT WATER
HEPA	HIGH EFFICIENCY PARTICULATE FILTER	MFS	MAXIMUM FUSE SIZE	UV-#	UNIT VENTILATOR
ER	EXHAUST REGISTER	MIN	MINIMUM	VD	VOLUME DAMPER
ES	END SUCTION	MTR	MOTOR	VE	VOLUME EXTRACTOR
ESP	EXTERNAL STATIC PRESSURE	MUA	MAKE-UP AIR	VFD	VARIABLE FREQUENCY DRIVE
ET-#	EXPANSION TANK	MV	MOTORIZED VALVE	VI	VIBRATION ISOLATOR
ETR	EXISTING TO REMAIN	NC	NOISE CRITERIA	VSF	VARIABLE SPEED FAN SWITCH
EUH-#	ELECTRIC UNIT HEATER	NFA	NET FREE AREA	W/	WITH
EWT	ENTERING WATER TEMPERATURE	NIC	NOT IN THIS CONTRACT	WB	WET BULB
EXP-#	EXPANSION LOOP	NO	NORMALLY OPEN	WFM	WATER FLOW MEASURING STATION
EX	EXISTING			WMS	WIRE MESH SCREEN
EXH	EXHAUST			WPD	WATER PRESSURE DROP
EXT	EXTERNAL			WT	WEIGHT (LBS)
°F	DEGREES FAHRENHEIT			ZD	ZONE DAMPER
F&B	FACE & BYPASS DAMPER				

* ALL ABBREVIATIONS MAY NOT BE USED IN THESE DOCUMENTS.

MECHANICAL CONTROLS & SEQUENCE OF OPERATIONS

HVAC INSTRUMENTATION & CONTROLS

QUALITY ASSURANCE

ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.

COMPLY WITH ASHRAE 135 FOR DDC SYSTEM COMPONENTS.

COORDINATION:

COORDINATE LOCATION OF THERMOSTATS AND OTHER EXPOSED CONTROL SENSORS WITH PLANS AND ROOM DETAILS BEFORE INSTALLATION.

MANUFACTURER:

CONTROL SYSTEM SHALL CONSIST OF SENSORS, INDICATORS, ACTUATORS, FINAL CONTROL ELEMENTS, INTERFACE EQUIPMENT, OTHER APPARATUS, ACCESSORIES AND SOFTWARE AS REQUIRED TO CONNECT TO THE EXISTING BUILDING BMS SYSTEM (SNE, BUILDING SYSTEMS) AND ACHIEVE THE BELOW NOTED SEQUENCE OF OPERATIONS.

SEQUENCE OF OPERATION

RACK ROOM COOLING (AC-1 & ACCU-1)

1. AC-1 & ACCU-1 SHALL OPERATE CONTINUOUSLY TO MAINTAIN SPACE SET POINT.
3. FACILITY BAS SHALL MONITOR SPACE TEMPERATURE OF EACH ROOM AND ON/OFF STATUS. REPORT AN ALARM IF SPACE TEMPERATURE RISES 3˚F ABOVE SET POINT (MAXIMUM 75˚F ADJ.).

VRF SYSTEM (ACCU-2 AND ASSOCIATED INDOOR UNITS)

1. THE BUILDING MANAGEMENT SYSTEM SHALL MONITOR AND CONTROL THE VRV SYSTEM CONTROLS VIA BACNET COMMUNICATION INTERFACE. THE AUTOMATIC TEMPERATURE CONTROLS (ATC) CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR INSTALLATION AND COMMUNICATION WIRING OF ALL VRV CONTROL COMPONENTS INCLUDING REMOTE CONTROLLERS/SENSORS, SYSTEM CONTROLLER(S), INDOOR UNITS, AND OUTDOOR UNITS.
2. IF ALTERNATE VRV MANUFACTURE IS SUBMITTED ATC CONTRACTOR, VRV MANUFACTURER AND MECHANICAL CONTRACTOR ARE TO PROVIDE ALL PARTS AND ACCESSORIES FOR A COMPLETE AND OPERATIONAL SYSTEM TO OPERATE AS DESCRIBED BELOW. IF ALTERNATE SENSORS ARE REQUIRED BY DEVIATING FROM THE BASIS OF DESIGN ATC IS TO PROVIDE INSTALLATION AND COMMUNICATION WIRING FOR THESE DEVICES.
3. FACILITY BAS SHALL MONITOR SPACE TEMPERATURE OF EACH ROOM AND ON/OFF STATUS. REPORT AN ALARM IF SPACE TEMPERATURE RISES 3˚F ABOVE SET POINT (75˚F ADJ. SUMMER & 68˚F ADJ. WINTER).
4. VRF SYSTEM OPERATION SHALL BE INTERLOCKED WITH EXISTING TERMINAL BOX OPERATION. VRF UNIT SHALL BE USED AS SECOND STAGE OF HEATING AND/OR COOLING WHEN REQUIRED TO MAINTAIN SPACE SETPOINT.

VRF SYSTEM (ACCU-3 AND ASSOCIATED INDOOR UNITS)

1. THE BUILDING MANAGEMENT SYSTEM SHALL MONITOR AND CONTROL THE VRV SYSTEM CONTROLS VIA BACNET COMMUNICATION INTERFACE. THE AUTOMATIC TEMPERATURE CONTROLS (ATC) CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR INSTALLATION AND COMMUNICATION WIRING OF ALL VRV CONTROL COMPONENTS INCLUDING REMOTE CONTROLLERS/SENSORS, SYSTEM CONTROLLER(S), INDOOR UNITS, AND OUTDOOR UNITS.
2. IF ALTERNATE VRV MANUFACTURE IS SUBMITTED ATC CONTRACTOR, VRV MANUFACTURER AND MECHANICAL CONTRACTOR ARE TO PROVIDE ALL PARTS AND ACCESSORIES FOR A COMPLETE AND OPERATIONAL SYSTEM TO OPERATE AS DESCRIBED BELOW. IF ALTERNATE SENSORS ARE REQUIRED BY DEVIATING FROM THE BASIS OF DESIGN ATC IS TO PROVIDE INSTALLATION AND COMMUNICATION WIRING FOR THESE DEVICES.
3. FACILITY BAS SHALL MONITOR SPACE TEMPERATURE OF EACH ROOM AND ON/OFF STATUS. REPORT AN ALARM IF SPACE TEMPERATURE RISES 3˚F ABOVE SET POINT (75˚F ADJ. SUMMER & 68˚F ADJ. WINTER).

FRESH AIR INTAKE FAN (SF-1)

1. THE EXHAUST FANS SHALL BE ENABLED AND DISABLED BASED ON A PREDETERMINED UNIT OPERATING SCHEDULE. THE FAN SHALL START AND STOP ON COMMAND FROM THE BAS PANEL.

TOILET EXHAUST (EF-1)

1. THE EXHAUST FANS SHALL BE ENABLED AND DISABLED BASED ON A PREDETERMINED UNIT OPERATING SCHEDULE. THE FAN SHALL START AND STOP ON COMMAND FROM THE BAS PANEL.

RADIANT PANELS (RP-1)

1. RADIANT PANEL OPERATION SHALL BE INTERLOCKED WITH EXISTING FAN POWERED & VAV TERMINAL BOX OPERATION.
2. SPACE SENSOR SHALL OPEN/CLOSE RADIATION OR MODULATE RADIANT PANEL CONTROL VALVE BASED ON OCCUPANCY SCHEDULE TO MAINTAIN SPACE SET POINT AS THE FIRST STAGE OF HEATING WHEN USED IN CONJUNCTION WITH A VAV BOX WITH HOT WATER REHEAT. WHEN USED INDEPENDENTLY VALVE SHALL BE TWO POSITION.
3. WHERE RADIANT PANEL OR FINNED TUBE AND VAV BOX(ES) WITH HEATING COIL(S) ARE CONTROLLED BY SAME SPACE SENSOR, SPACE SENSOR SHALL FIRST INITIATE RADIANT PANEL OR FINNED TUBE HEATING ON AND THEN UPON FURTHER DROP IN SPACE TEMPERATURE AND AFTER VAV IS AT MINIMUM FLOW, VAV HEATING COIL CONTROL VALVE SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE.

DESIGN SPACE SETPOINTS

1. SUMMER - 75°F DB
2. WINTER - 68°F DB

Central Connecticut State University

1615 Stanley Street
New Britain, CT 06050

OakPark Architects LLC
312 Park Rd, W. Hartford, CT (860)232-6664

93 Lake Avenue, Danbury, CT 06810
203.778.1017 F 203.778.1018

171 Madison Avenue,
New York, NY 10016
212.695.2422 F 212.695.2423

www.kohlerronan.com
E-mail krce@kohlerronan.com

KOHLER RONAN, LLC
CONSULTING ENGINEERS

REVISIONS

NUMBER	DATE	DESCRIPTION

MEDIA CENTER RELOCATION TO ELIHU BURRITT LIBRARY

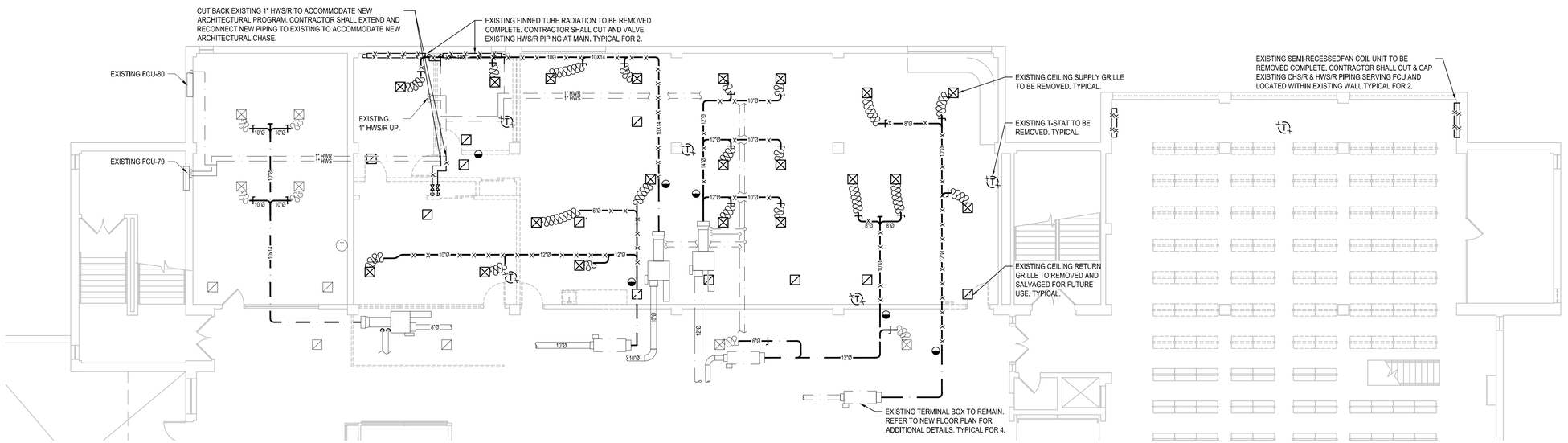
KEY PLAN
NOT TO SCALE

N W E S

CCSU PROJECT No.:	22-87
DPW PROJECT No.:	BI-RC-397
DRAWN BY:	FMD
DATE:	6/14/2016
CAD FILE:	

SYMBOLS & ABBREVIATIONS - MECHANICAL

BUILDING No.:	DRAWING No.:
22	M-002



1 MD-102 PARTIAL SECOND FLOOR DEMOLITION PLAN
SCALE: 1/8" - 1'-0"

Central Connecticut State University

1615 Stanley Street
New Britain, CT 06050

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www.kohlerronan.com
E-mail krce@kohlerronan.com

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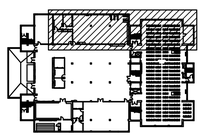


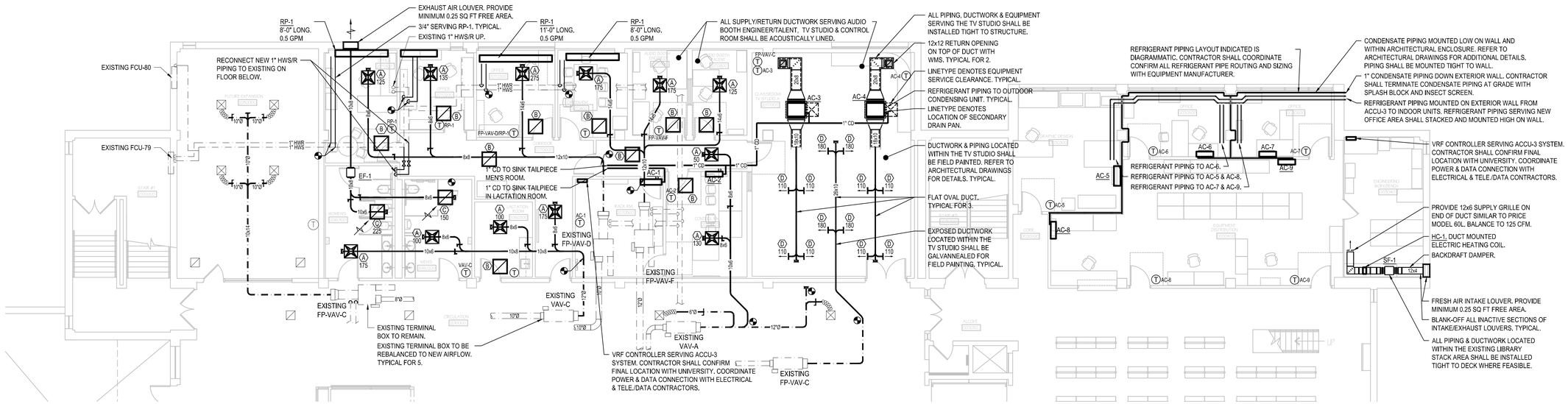
KEY PLAN
NOT TO SCALE

N W E S

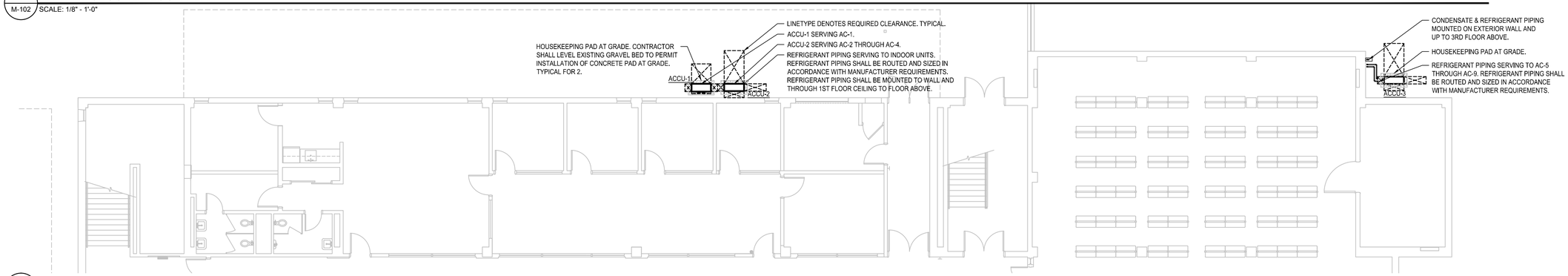
CCSU PROJECT No.:	22–87
DPW PROJECT No.:	BI–RC–397
DRAWN BY:	FMD
DATE:	6/14/2016
CAD FILE:	

PARTIAL SECOND FLOOR DEMO PLAN-MECHANICAL

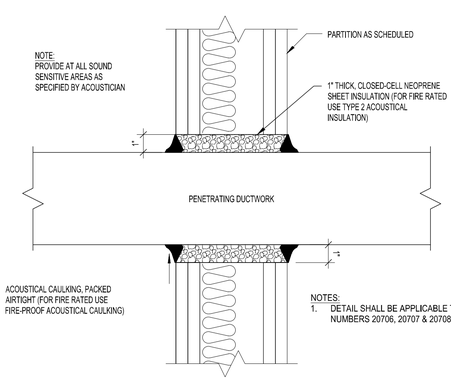
BUILDING No.:	DRAWING No.:
22	MD-102



1 M-102 PARTIAL SECOND FLOOR PLAN
SCALE: 1/8" - 1'-0"

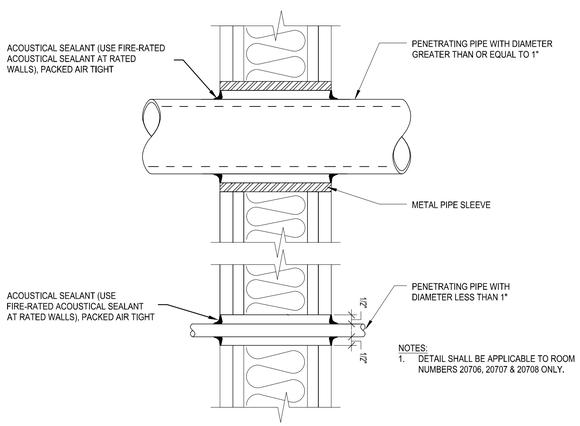


2 M-102 PARTIAL FIRST FLOOR PLAN
SCALE: 1/8" - 1'-0"



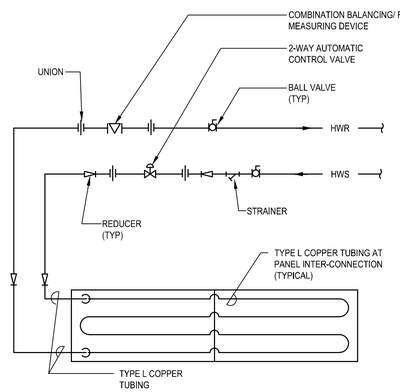
NOTES:
1. DETAIL SHALL BE APPLICABLE TO ROOM NUMBERS 20706, 20707 & 20708 ONLY.

3 M-102 DUCT PENETRATION OF DRYWALL CONSTRUCTION DETAIL
NOT TO SCALE



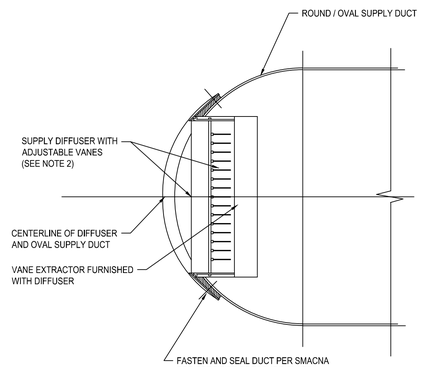
NOTES:
1. DETAIL SHALL BE APPLICABLE TO ROOM NUMBERS 20706, 20707 & 20708 ONLY.

4 M-102 DUCT/PIPE PENETRATION OF MASONRY/CONCRETE CONSTRUCTION DETAIL
NOT TO SCALE



NOTES:
1. THE COMBINATION AUTOMATIC BALANCING/FLOW MEASURING DEVICE SHALL NOT BE REQUIRED ON DEVICES WHERE PRESSURE INDEPENDENT CONTROL VALVES ARE INSTALLED.

5 M-102 RADIANT PANEL PIPING CONNECTION DETAIL
NOT TO SCALE



NOTES:
1. INSTALL DIFFUSER/REGISTER PER SMACNA AND MANUFACTURERS RECOMMENDATIONS.
2. ADJUST DIFFUSER VANES TO ANGLE INDICATED ON SCHEDULE AND MANUFACTURERS RECOMMENDATIONS.

6 M-102 TYPICAL EXPOSED OVAL DUCT SUPPLY DIFFUSER DETAIL
NOT TO SCALE

Central Connecticut State University
1615 Stanley Street
New Britain, CT 06050

OakPark Architects LLC
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REVISIONS

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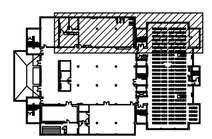

KEY PLAN
NOT TO SCALE

N W E S

CCSU PROJECT No.:	22-87
DPW PROJECT No.:	BI-RC-397
DRAWN BY:	FMD
DATE:	6/14/2016
CAD FILE:	

PARTIAL FLOOR PLAN- MECHANICAL

BUILDING No.:	DRAWING No.:
22	M-102

HVAC PIPING/TUBING MATERIAL, JOINTS & FITTINGS

SYSTEM	PIPE SIZE	CONSTRUCTION	PIPING	FITTINGS	UNIONS	FLANGES
HOT WATER, GLYCOL AND HEATING BRINE SUPPLY AND RETURN, VENTS AND DRAINS	2" AND SMALLER	SOLDER JOINT CONSTRUCTION WITH THREADED ADAPTERS AS REQUIRED. 95-5 TIN/ANTIMONY SOLDER.	COPPER, TYPE L, HARD DRAWN, ANSI H23.1, ASTM B88.	CAST BRONZE OR WROUGHT COPPER, SOLDER ENDS, ANSI B16.9 OR ANSI B16.22.	BRONZE SOLDER ENDS, GROUND JOINTS, ANSI B16.19 OR ANSI B16.22.	CAST BRONZE, CLASS 150, SOLDER TYPE, ANSI B16.24.
	2 1/2" AND LARGER	BUTT WELDED CONSTRUCTION WITH FLANGED CONNECTIONS TO VALVES AND EQUIPMENT AS REQUIRED.	BLACK STEEL, SCHEDULE 40, SEAMLESS, ASTM A53, GRADE B.	STEEL, CLASS 150, BUTT WELD ENDS, ANSI B16.9, ASTM A234.	STEEL, CLASS 150, WELD TYPE, ANSI B16.5, ASTM 181, GRADE 1.	STEEL, CLASS 150, WELD TYPE, ANSI B16.5, ASTM A234, GRADE WPA.
COOLING COIL CONDENSATE DRAINS	2" AND SMALLER	SOLDER JOINT CONSTRUCTION WITH THREADED ADAPTERS AS REQUIRED. 95-5 TIN/ANTIMONY SOLDER.	COPPER, TYPE L, HARD DRAWN, ANSI H23.1, ASTM B88.	CAST BRONZE OR WROUGHT COPPER, SOLDER ENDS, ANSI B16.9 OR ANSI B16.22.	BRONZE SOLDER ENDS, GROUND JOINTS, ANSI B16.19 OR ANSI B16.22.	USE UNIONS
	2 1/2" AND LARGER	SOLDER JOINT CONSTRUCTION WITH THREADED ADAPTERS AS REQUIRED. 95-5 TIN/ANTIMONY SOLDER.	COPPER, TYPE L, HARD DRAWN, ANSI H23.1, ASTM B88.	CAST BRONZE OR WROUGHT COPPER, SOLDER ENDS, ANSI B16.9 OR ANSI B16.22.	BRONZE SOLDER ENDS, GROUND JOINTS, ANSI B16.19 OR ANSI B16.22.	USE UNIONS
REFRIGERANT SUCTION, HOT GAS AND LIQUID PIPING AND TUBING	2" AND SMALLER	BRAZED JOINT CONSTRUCTION. AWS A5.8 FILLER METAL.	COPPER, ACR TUBING, STRAIGHT LENGTHS, DRAWN H58, ASTM B 280.	WROUGHT COPPER, BRAZED ENDS, ANSI B16.22.	WROUGHT COPPER, BRAZED ENDS, ANSI B16.22.	USE UNIONS
	2 1/2" AND LARGER	BRAZED JOINT CONSTRUCTION. AWS A5.8 FILLER METAL.	COPPER, ACR TUBING, STRAIGHT LENGTHS, DRAWN H58, ASTM B 280.	WROUGHT COPPER, BRAZED ENDS, ANSI B16.22.	WROUGHT COPPER, BRAZED ENDS, ANSI B16.22.	USE UNIONS

HVAC PIPING/TUBING INSULATION

SYSTEM	LOCATION	PIPE SIZE	CELLULAR GLASS		FLEXIBLE ELASTOMERIC		MINERAL-FIBER TYPE I	
			THICKNESS, IN.	CONDUCTIVITY, k	THICKNESS, IN.	CONDUCTIVITY, k	THICKNESS, IN.	CONDUCTIVITY, k
CONDENSATE & EQUIPMENT DRAIN, BELOW 60°F	INDOOR	ALL	1-1/2"	0.29	-	-	1"	0.23
	OUTDOOR ABOVE GRADE	ALL	1-1/2"	0.29	-	-	-	-
HEATING HOT WATER AND GLYCOL, BELOW 200°F	INDOOR	1-1/2" & SMALLER	2"	0.33	-	-	1-1/2"	0.25
		2" & LARGER	2-1/2"	0.33	-	-	2"	0.25
	OUTDOOR ABOVE GRADE	ALL	2-1/2"	0.33	-	-	-	-
REFRIGERANT (ALL) SUCTION, HOT GAS, VAPOR, & LIQUID PIPING	INDOOR	ALL	1-1/2"	0.29	1"	0.26	1"	0.23
	OUTDOOR ABOVE GRADE	ALL	1-1/2"	0.29	1"	0.26	-	-
REFRIGERANT (ALL) SUCTION, HOT GAS, VAPOR, & LIQUID FLEXIBLE TUBING	INDOOR	ALL	-	-	1"	0.26	-	-
	OUTDOOR ABOVE GRADE	ALL	-	-	1"	0.26	-	-

BLANKS (-) INDICATE INSULATION TYPE SHALL NOT BE USED.
THICKNESS BASED ON INSULATION HAVING A THERMAL CONDUCTIVITY (K) NOT EXCEEDING VALUES NOTED IN TABLE ABOVE (BTU PER INCH/H• FT• °F). FOR ALL OTHER K VALUES CONTRACTOR TO PERFORM CALCULATIONS IN SECTION C403.2.8 OF THE NYCECC 2014 CODE TO PROVE OTHER INSULATION THICKNESSES.

1. ALL ELBOWS; CONCEALED OR EXPOSED, SHALL BE COVERED WITH PVC FITTING COVERS. PVC FITTING COVERS SHALL BE 25/50 FLAME AND SMOKE SPREAD RATED. COVER COLOR TO BE SELECTED BY ARCHITECT. PROVIDE TEMPLATE OF JACKET COLORS FOR THE ARCHITECT'S REVIEW.
2. DIAPER AND LOOSE FILL STYLE INSULATION ON PIPE FITTINGS IS NOT ACCEPTABLE. ELBOWS WITHOUT PVC COVERS ARE NOT ACCEPTABLE.
3. INSULATE ALL COILS MOUNTED IN DUCTWORK OR TERMINAL BOXES. INSULATION THICKNESS SHALL BE EQUAL TO THE ASSOCIATED DUCT INSULATION THICKNESS.
4. ALL OUTDOOR PIPING/TUBING SHALL BE FITTED WITH A PRE-MANUFACTURED ALUMINUM JACKET PRODUCT. 0.024" ALUMINUM JACKET LOCK-ON OR SLIP-ON TYPE JACKETING TO BE COVERED WITH ACRYLIC COATING ON THE OUTER SURFACE AND A BAKED EPOXY MOISTURE BARRIER ON THE INNER SURFACE. MANUFACTURER SHALL BE SIMILAR TO CHILDERS PRODUCTS, DIVISION OF ITW; METAL JACKETING SYSTEMS. ALL EXPOSED JOINTS IN THE JACKET PRODUCT SHALL BE INSTALLED IN SUCH A WAY AS TO PREVENT THE INFILTRATION OF MOISTURE AND WATER.

HVAC VIBRATION-CONTROL

EQUIPMENT	BASE	ISOLATOR*	DEFLECTION
CONDENSING UNITS (GRADE AND ROOF MOUNTED)	24" HIGH EQUIPMENT RAILS	NP	0.2"
SUSPENDED INLINE FANS	-	HSN	1.5"
FAN COIL UNITS, CEILING MOUNTED	-	HSN	1.2"
PIPING WITHIN 50FT OF CONNECTION TO ANY PIECE OF EQUIPMENT WITH A MOTOR	-	HSN	1.2"
DUCTWORK IN MECH. ROOMS OR WITHIN 50FT OF CONNECTED VIBRATION-ISOLATED EQUIPMENT	-	HN	0.25"

REMARKS:
1. REFER TO SPECIFICATIONS - "VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT" FOR A DESCRIPTION OF EACH VIBRATION CONTROL DEVICE.
2. (NP) - NEOPRENE PAD, (DNP) - DOUBLE NEOPRENE PAD, (FNC) - FLOOR NEOPRENE RESTRAINED MOUNTS, (FSN) - FLOOR SPRING AND NEOPRENE SPRING ISOLATOR, (FSNTL) - FLOOR SPRING AND NEOPRENE TRAVEL LIMITED RESTAINED SPRING ISOLATOR, (HN) - NEOPRENE HANGER, (HSN) - SPRING AND NEOPRENE HANGER, (RC) - ROOF CURB, (BSF) - BASE, STEEL FRAME, (BIB) - BASE, INERTIA BASE, (FPC) - FLEXIBLE PIPE CONNECTIONS, (SRC) - SEISMIC ROOF CURB.
3. SEISMIC ANCHORS, SUPPORTS AND BRACING EQUIPMENT SHALL BE PROVIDED. THE DESIGN OF ALL COMPONENTS SHALL BE SUBMITTED SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF THE PROJECT INDICATING ALL NECESSARY COMPONENT CUT SHEETS, PLAN LOCATIONS AND CALCULATIONS FOR A COMPLETE SYSTEM.
4. PROVIDE SUPPLEMENTAL STEEL WITHIN THE ROOF CURB TO SUPPORT DUCTWORK INDEPENDENT FROM THE ROOF CURB.

* IN ADDITION TO ANY INTERNAL VIBRATION ISOLATION.
** SYSTEM SHALL BE DESIGNED TO BE 90% EFFICIENT.

HVAC DUCT/PLENUM INSULATION

SYSTEM	INSULATION TYPE	MINIMUM INSTALLED INSULATION VALUES	NOMINAL DENSITY
INDOOR DUCT/PLENUM CONCEALED SA, RA, OA: OTHER THAN PRE-MANUFACTURED LINEAR SUPPLY AND RETURN GRILLE PLENUMS.	MINERAL FIBER BLANKET	2" R-6.0	3/4 LB/FT^3
	MINERAL FIBER BOARD WITH REFLECTIVE VAPOR BARRIER.	2" R-6.0	3 LB/FT^3
INDOOR DUCT/PLENUM EXPOSED SA AND RA: LOCATED WITHIN THE AIR-CONDITIONED SPACE IT SERVES.	NONE; UNLESS OTHERWISE NOTED ON THE DRAWINGS OR IN THE SPECIFICATION.	-	-
DUCT LINING DUCTS/PENUMS INSTALLED IN INDOOR SPACES, ATTICS AND CRAWLSPACES: EXPOSED AND CONCEALED SA OR RA DUCTWORK WHERE INDICATED ON THE DRAWINGS AND IN THE SPECIFICATION, 15 FT UPSTREAM & DOWNSTREAM OF SUPPLY FANS, RETURN FANS AND 10 FT DOWNSTREAM OF TERMINAL BOXES WHETHER INDICATED OR NOT.	FIBROUS-GLASS DUCT LINER WITH CLEANABLE COMPOSITE COATING ON AIRSTREAM SIDE. METAL NOSING SHALL BE FURNISHED ON ALL LEADING EDGES. (REFER TO NOTES #2, #4)	1-1/2" R-6.0	3 LB/FT^3

1. ALL DUCTWORK INSTALLED OUTDOOR: PROVIDE A PRE-MANUFACTURED SELF ADHERING PRODUCT WITH AN UV RESISTANT, STUCCO EMBOSSED FACING. WATER VAPOR TRANSMISSION OF THE INSTALLED PRODUCT SHALL BE .020 PERMS OR LESS. PRODUCT SHALL BE SUITABLE FOR CONTINUOUS USE IN LOW TEMPERATURES OF -10°F. MANUFACTURERS SHALL BE SIMILAR TO FLEX-CLAD 400, MFM BUILDING PRODUCTS CORP. OR ALUMAGUARD 60, POLYGUARD PRODUCTS, INC.
2. DUCT LINING SHALL NOT BE INSTALLED WITHIN 10 FT UPSTREAM OR DOWNSTREAM OF A DUCT MOUNTED HUMIDIFIER DISPERSION TUBE OR DISPERSION GRID.
3. INSULATION TYPES INDICATED IN THE SCHEDULE SHALL USED UNLESS OTHERWISE INDICATED ON THE PLANS OR SPECIFICATIONS.
4. CLOSED CELL, FIBER FREE, ANTI-MICROBIAL COATED, LOW VOC CERTIFIED, MOISTURE AND MOLD RESISTANT DUCT LINING SHALL BE PROVIDED IN DUCTWORK AND EQUIPMENT WITHIN HOSPITAL AND HEALTHCARE FACILITIES AND ROOMS CLASSIFIED AS MOIST OR WET ENVIRONMENTS WHERE THIS SCHEDULE, DRAWINGS AND SPECIFICATION INDICATE DUCT LINING.
5. DUCTWORK SHALL BE FIRE WRAPPED FROM THE APPLIANCE CONNECTION TO THE TERMINATION POINT.

OA = OUTDOOR AIR DUCTWORK
SA = SUPPLY AIR DUCTWORK
RA = RETURN AIR DUCTWORK
EA = EXHAUST AIR DUCTWORK

DUCT PRESSURE CLASS

APPLICATION	PRESSURE CLASS
SUPPLY AIR DUCTWORK FROM MAIN AND/OR TERMINAL UNIT TO AIR OUTLET.	2" W.G.
RETURN AIR DUCTWORK	2" W.G.
OUTDOOR AIR DUCTWORK	2" W.G.
GENERAL EXHAUST DUCTWORK	2" W.G.
TOILET EXHAUST DUCTWORK	2" W.G.

NOTES:
1. LEAKAGE CLASS SHALL BE DETERMINED PER ASHRAE 90.1-2010 REQUIREMENTS.
2. PRESSURE CLASS SHALL BE DEFINED PER SMACNA THIRD EDITION - 2015.
3. DUCTWORK, JOINTS, SEALING, AND FITTINGS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA THIRD EDITION - 2015.

HVAC DUCT/PLENUM MATERIAL

APPLICATION	SUPPLY	RETURN	EXHAUST
TYPICAL (UNLESS OTHERWISE SPECIFIED)	G90 GALVANIZED STEEL	G90 GALVANIZED STEEL	G90 GALVANIZED STEEL

1. DUCT CONSTRUCTION SHALL MEET SMACNA METAL & FLEXIBLE 2005 3RD EDITION STANDARDS.

Central Connecticut State University
1615 Stanley Street
New Britain, CT 06050

REVISIONS

NUMBER	DATE	DESCRIPTION

OakPark Architects LLC
312 Park Rd, W. Hartford, CT (860)232-6664
KOHLER RONAN, LLC CONSULTING ENGINEERS
93 Lake Avenue, Danbury, CT 06810
203.778.1017 F 203.778.1018
171 Madison Avenue,
New York, NY 10016
212.695.2422 F 212.695.2423
www.kohlerronan.com
E-mail krce@kohlerronan.com

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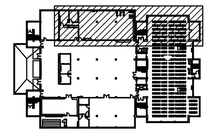

KEY PLAN
NOT TO SCALE

N W E S

CCSU PROJECT No.:	22-87
DPW PROJECT No.:	BI-RC-397
DRAWN BY:	FMD
DATE:	6/14/2016
CAD FILE:	

SCHEDULES - MECHANICAL

BUILDING No.:	DRAWING No.:
22	M-201

SPLIT AIR CONDITIONING UNITS

SYMBOL	LOCATION	SUMMER ROOM COND. TEMP. °F DB	WB	R.H.	INDOOR UNIT DATA CFM	VOLT	Ø	MBH	MAKE/MODEL	OUTDOOR UNIT SYMBOL	CAPACITY (MBH)	VOLT	Ø	MAKE/MODEL	SEER	REMARKS
AC-1	RACK ROOM	75°F	63°F	50%	491 MIN 713 MAX	208	1	24.0	DAIKIN FTKN24	ACCU-1	24.0 - COOLING	208	3	DAIKIN RK24NMVJU	18.0	
AC-2	CONTROL ROOM	75°F	63°F	50%	180 MIN 290 MAX	208	1	12.0 - C 8.9 - H	DAIKIN FXAQ12PVJU	ACCU-2	48.0 - COOLING 54.0 - HEATING	208	3	DAIKIN RXYMQ48PVJU	15.1	
AC-3	CLASSROOM TV STUDIO	75°F	63°F	50%	350 MIN 450 MAX	208	1	18.0 - C 20.0 - H	DAIKIN FXDQ18MVJU							
AC-4	CLASSROOM TV STUDIO	75°F	63°F	50%	350 MIN 450 MAX	208	1	18.0 - C 20.0 - H	DAIKIN FXDQ18MVJU							
AC-5	GRAPHIC DESIGN	75°F	63°F	50%	175 MIN 280 MAX	208	1	9.5 - C 10.5 - H	DAIKIN FXAQ09	ACCU-3	48.0 - COOLING 54.0 - HEATING	208	3	DAIKIN RXYMQ48PVJU	15.1	
AC-6	OFFICE 305	75°F	63°F	50%	160 MIN 260 MAX	208	1	7.5 - C 8.5 - H	DAIKIN FXAQ07							
AC-7	OFFICE 306	75°F	63°F	50%	160 MIN 260 MAX	208	1	7.5 - C 8.5 - H	DAIKIN FXAQ07							
AC-8	EQUIPMENT DISTRIBUTION	75°F	63°F	50%	175 MIN 280 MAX	208	1	9.5 - C 10.5 - H	DAIKIN FXAQ09							
AC-9	EQUIPMENT DISTRIBUTION	75°F	63°F	50%	175 MIN 280 MAX	208	1	9.5 - C 10.5 - H	DAIKIN FXAQ09							

NOTES:
1. ALL SPLIT SYSTEMS SHALL BE FURNISHED WITH NON-LOCKING DISCONNECT SWITCH FOR INDOOR UNIT, CONDENSER FUSED DISCONNECT SWITCH.
2. ALL SPLIT SYSTEMS SHALL BE FURNISHED WITH SUPPORTS FOR INDOOR, 7 DAY PROGRAMMABLE CONTROLLER AND CONDENSATE LIFT PUMP.
3. AC-1 SHALL BE FURNISHED WITH ALL EQUIPMENT REQUIRED FOR LOW AMBIENT OPERATION.
4. AC-3 & AC-4 SHALL BE FURNISHED WITH SECONDARY DRAIN PAN AND LEAK DETECTION.

FANS

UNIT NO	LOCATION	SYSTEM SERVED	TYPE	CFM	SP	MAX BHP	FAN RPM	TIP SPEED	SOUND SONES	ELECTRICAL HP	VOLTS	PH	RPM	MAKE/MODEL	REMARKS
EF-1	SECOND FLOOR MEDIA CENTER	TOILET EXHAUST	INLINE	375	0.5"	0.07	1602		7.8	1/10	120	1	1725	GREENHECK SQ-90-VG	
SF-1	ENGINEERING WORKBENCH	VENTILATION SUPPLY AIR	INLINE	125	0.45"	-	-		-	72 WATTS	120	1	-	FANTECH 4XL	

NOTES:
1. ALL FANS SHALL BE BALANCED TO AIRFLOW QUANTITY INDICATED ON PLANS AT INLETS AND OUTLETS.
2. FANS SHALL BE FURNISHED WITH SPEED CONTROLLER FOR BALANCING.
3. EF-1 & SF-1 SHALL BE PROVIDED WITH BACKDRAFT DAMPER LOCATED AT BUILDING INTAKE/EXHAUST LOUVER CONNECTION.

RADIANT PANELS

UNIT NO	LOCATION	EWT	MWT	LWT	BTU/FT	WIDTH	LENGTH	TUBE SIZE	TUBE MATL	MAKE/MODEL	REMARKS
RP-1	REFER TO PLANS	180°F	170°F	160°F	262	12"	REFER TO PLANS	5/8"	CU	PRICE RPL	

NOTES:
1. PROVIDE STANDARD COLOR CHART FOR SELECTION BY ARCHITECT.
2. REFER TO PLANS FOR LENGTH & QUANTITIES.

ELECTRIC DUCT HEATERS

UNIT NO	LOCATION	SERVES	CAP KW	AIR DATA CFM	EAT	LAT	PD	ELECTRICAL VOLTS	PHASE	STAGES	ELEMENT TYPE	SIZE W X H	MAKE/MODEL	REMARKS
HC-1	REFER TO PLANS	SF-1	2.5	125	8°F	70°F	-	-	1	MINIMUM 2	-	10 x 6	INDEECO QUA	

NOTES:
1. HC-1 OPERATION SHALL BE INTERLOCKED WITH SF-1.
2. HC-1 SHALL BE PROVIDED WITH

REGISTERS, GRILLES & DIFFUSERS

SYM	SERVICE	TYPE	MAKE	MODEL	MATERIAL FINISH	CFM	NECK SIZE	FACE SIZE	NC LEVEL	REMARKS
A	SUPPLY	CD	PRICE	SMD	STEEL PER ARCHITECT	0 - 125 126 - 215	6 x 6 9 x 9	24" x 24"	SELECTION SHALL BE ≤ NC-25	
A	SUPPLY	CD	PRICE	SMD	STEEL PER ARCHITECT	216 - 300 301 - 500	12 x 12 15 x 15	24" x 24"	SELECTION SHALL BE ≤ NC-25	
B	RETURN	CD	PRICE	535L	STEEL PER ARCHITECT	0 - 950	-	24" x 24"	SELECTION SHALL BE ≤ NC-25	
C	EXHAUST	CD	PRICE	535L	STEEL PER ARCHITECT	0 - 950	-	24" x 24"	SELECTION SHALL BE ≤ NC-25	
D	SUPPLY	SG	PRICE	SDGE	STEEL PER ARCHITECT	0 - 100 101 - 150	10 x 5 12 x 6	24" x 24"	SELECTION SHALL BE ≤ NC-20	PRIMED FOR FIELD PAINTING PROVIDE AIR SCOOP
D	SUPPLY	SG	PRICE	SDGE	STEEL PER ARCHITECT	151 - 200	18 x 6	24" x 24"	SELECTION SHALL BE ≤ NC-20	PRIMED FOR FIELD PAINTING PROVIDE AIR SCOOP

NOTES:
1. PROVIDE 3 WAY DIFFUSER AT ALL LOCATIONS WHERE DIFFUSER IS LOCATED WITHIN 2' OF ANY WALL. ALL OTHER DIFFUSERS ARE TO BE 4 WAY.
2. COORDINATE AIR TERMINAL LOCATIONS WITH ARCHITECTURAL PLANS, ELEVATIONS, AND SECTIONS.
3. PROVIDE STANDARD COLOR CHART FOR COLOR SELECTION BY ARCHITECT.
4. BORDER, FRAME, & MOUNTING STYLE SHALL BE COORDINATED WITH ARCHITECT. REFER TO PLANS FOR ADDITIONAL BORDER, FRAME & MOUNTING REQUIREMENTS.
5. PROVIDE CONCEALED MOUNTING FOR ALL REGISTERS, GRILLES AND DIFFUSERS.

Central Connecticut State University

1615 Stanley Street
New Britain, CT 06050

OakPark Architects LLC
312 Park Rd, W. Hartford, CT (860)232-6664

KOHLER RONAN, LLC CONSULTING ENGINEERS
93 Lake Avenue, Danbury, CT 06810
203.778.1017 F 203.778.1018
171 Madison Avenue,
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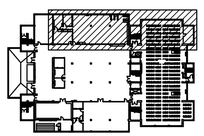

KEY PLAN
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N W E S

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DRAWN BY:	FMD
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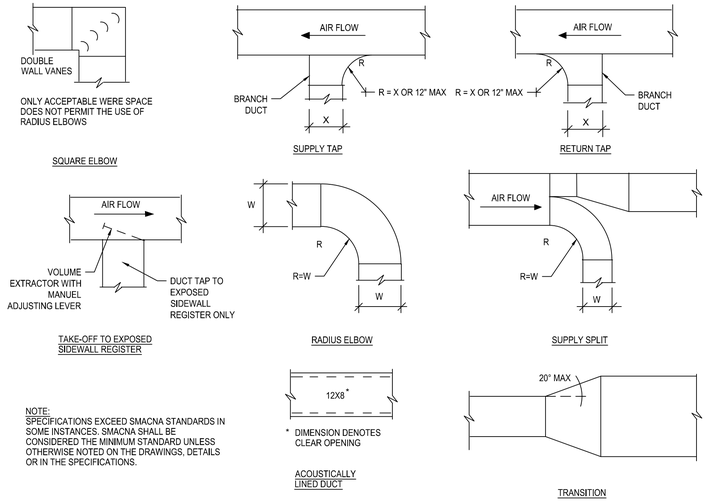
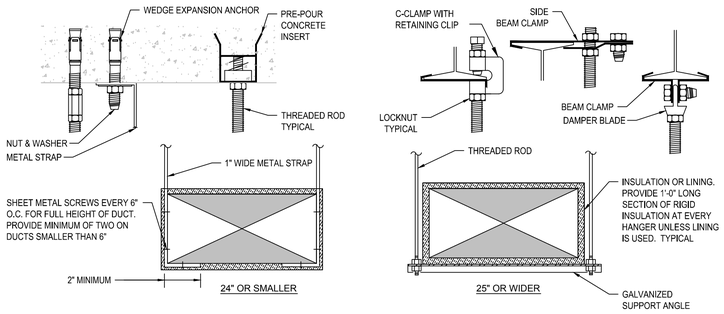
SCHEDULES - MECHANICAL

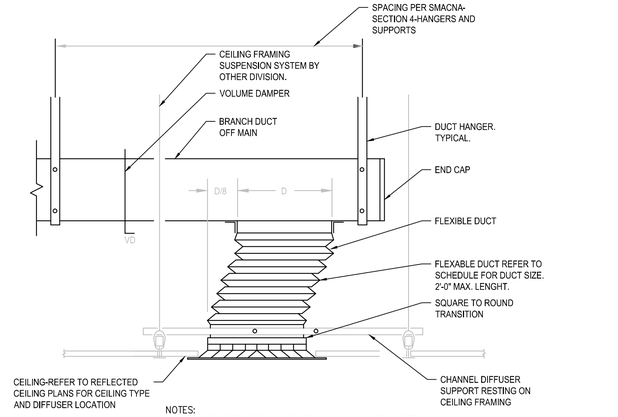
BUILDING No.:	DRAWING No.:
22	M-202





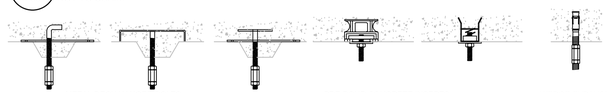
DUCT WIDTH	SUPPORT ANGLE OR EQUIV. CHANNEL	ROD DIA.	MAXIMUM SPACING	MAXIMUM AREA *
25" TO 30"	1 1/2" X 1 1/2" X 1/8"	3/8"	8'-0" O.C.	4 SQ. FT.
31" TO 42"	1 1/2" X 1 1/2" X 1/8"	3/8"	6'-0" O.C.	10 SQ. FT.
43" TO 60"	1 1/2" X 1 1/2" X 1/8"	1/2"	6'-0" O.C.	10 SQ. FT.
61" TO 84"	2" X 2" X 1/4"	1/2"	4'-0" O.C.	–
85" AND UP	2" X 2" X 1/4"	1/2"	4'-0" O.C.	–

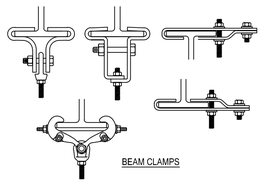
* REDUCE SPACING TO NEXT SMALLER INTERVAL IF DUCT AREA EXCEEDS MAXIMUM

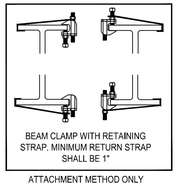


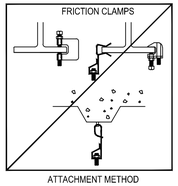
NOTES:
1. PROVIDE DIFFUSER W/OPPOSED BLADE CABLE OPERATED DAMPERS W/ IN-AIRSTREAM OPERATORS WHERE INSTALLED IN HARD INACCESSIBLE CEILING.
2. OFFSET SHALL NOT EXCEED D/8".

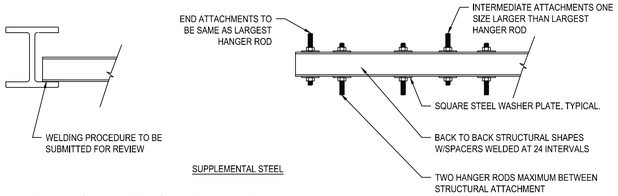
1 DUCT CONSTRUCTION DETAIL
M-301 NOT TO SCALE



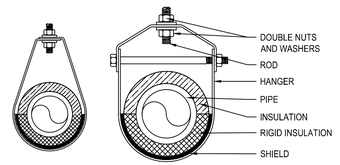




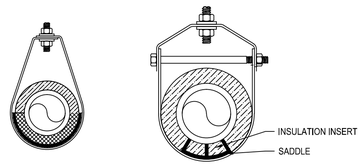




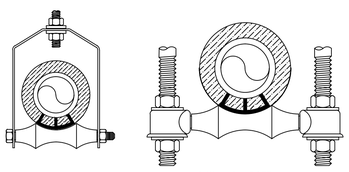
2 DUCT SUPPORT DETAIL
M-301 NOT TO SCALE



FLUIDS LESS THAN 100°F



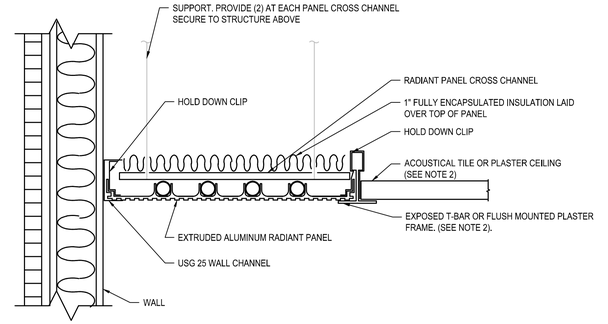
FLUIDS GREATER THAN 100°F



FLUIDS 150°F-250°F 50' FROM ANCHOR
FLUIDS GREATER THAN 250°F 30' FROM ANCHOR

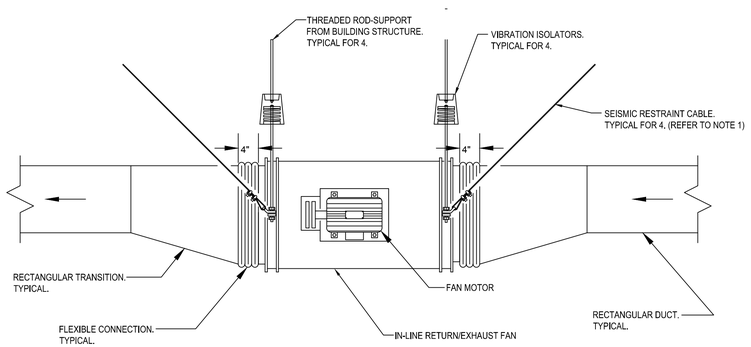
HANGER SCHEDULE		
PIPE SIZE	ROD SIZE	MAX. SPACING
UP TO 1 1/4"	3/8" DIA.	8' STEEL
UP TO 1 1/4"	3/8" DIA.	6' COPPER & BRASS
1 1/2" & 2"	3/8" DIA.	10'
2 1/2" & 3"	1/2" DIA.	10'
4" & 5"	5/8" DIA.	10'
6"	3/4" DIA.	10'
8", 10", 12"	7/8" DIA.	10'
14" & 16"	1" DIA.	10'
18"	1 1/8" DIA.	10'
20" & 24"	1 1/4" DIA.	10'

3 TYPICAL GRILLE/DIFFUSER DETAIL WITH FLEXIBLE DUCTWORK CONNECTION
M-301 NOT TO SCALE



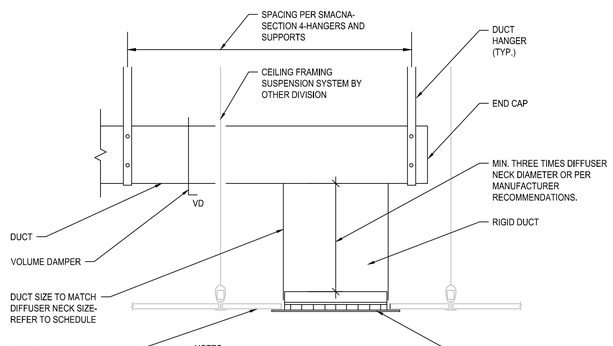
NOTE:
1. PROVIDE CLEARANCE AROUND PANEL FOR THERMAL EXPANSION IN ACCORDANCE WITH MANUFACTURERS INSTALLATION INSTRUCTIONS.
2. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR CEILING TYPE.

4 PIPE HANGER ATTACHMENT DETAIL
M-301 NOT TO SCALE



NOTE:
1. INSTALL SEISMIC RESTRAINT CABLES PER SMACNA SEISMIC RESTRAINT MANUAL GUIDELINES FOR MECHANICAL SYSTEMS.

5 PIPE HANGER DETAIL
M-301 NOT TO SCALE



NOTES:
1. PROVIDE DIFFUSER W/OPPOSED BLADE CABLE OPERATED DAMPERS W/ IN-AIRSTREAM OPERATORS WHERE INSTALLED IN HARD INACCESSIBLE CEILING.
2. RIGID DUCT CONNECTION TO RGD SHALL BE APPLICABLE TO ROOM NUMBERS 20706, 20707 & 20708 ONLY.

6 RADIANT PANEL INSTALLATION DETAIL
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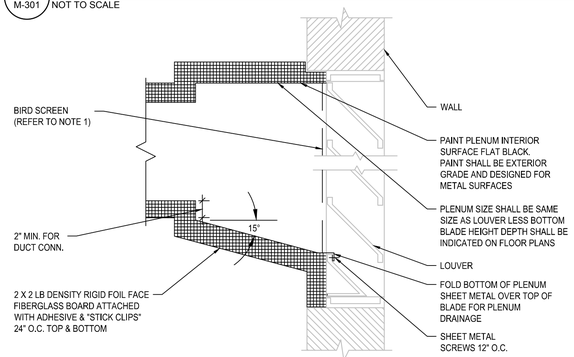

NOTES:
1. COVER INSIDE FACE OF LOUVER WITH 1/2" MESH ALUMINUM BIRD SCREEN SCREWED IN PLACE.
2. INSULATE UNUSED PORTION OF LOUVER WITH 2" DOUBLE WALL INSULATED PANELS.
3. SEAL ALL PLENUM SEAMS WATERTIGHT WITH SILICONE SEALANT.
4. TYPICAL FOR SUPPLY AND EXHAUST PLENUMS.
5. PROVIDE ACCESS DOOR IN PLENUM. DOOR SHALL BE FIELD COORDINATED FOR ACCESS. DOOR SIZE SHALL BE 36" HIGH x 18" WIDE. REFER TO SPECIFICATION FOR DOOR CONSTRUCTION.

7 INLINE CENTRIFUGAL FAN INSTALLATION DETAIL
M-301 NOT TO SCALE

8 TYPICAL GRILLE/DIFFUSER DETAIL WITH RIGID DUCTWORK CONNECTION
M-301 NOT TO SCALE

9 INTAKE AND EXHAUST LOUVER PLENUM DETAIL
M-301 NOT TO SCALE

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1615 Stanley Street
New Britain, CT 06050

OakPark Architects LLC
312 Park Rd, W. Hartford, CT (860)232-6664

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NUMBER	DATE	DESCRIPTION

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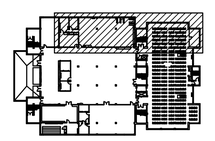


KEY PLAN
NOT TO SCALE

N W E S

CCSU PROJECT No.:	22-87
DPW PROJECT No.:	BI-RC-397
DRAWN BY:	FMD
DATE:	6/14/2016
CAD FILE:	

DETAILS - MECHANICAL

BUILDING No.:	DRAWING No.:
22	M-301

MECHANICAL SPECIFICATIONS

GENERAL

EQUIPMENT & PIPING IDENTIFICATION

CONSULT THE OWNER AS TO ANY LABELING STANDARDS INCLUDING NAMING CONVENTIONS, STANDARD LABELING MATERIALS AND LABELING COLOR CONVENTIONS. ALL NEW VALVE AND EQUIPMENT TAGS SHALL MATCH THE BUILDING STANDARD, WHERE NO STANDARD EXISTS, PROVIDE THE FOLLOWING:

FURNISH AND ATTACH TO EACH VALVE A 2" DIAMETER TAG OF SOLID BRASS WITH NUMBER AND SERVICE ABBREVIATED AS NOTED ON CONTRACT DRAWINGS. NUMBERS TO CORRESPOND TO CONSECUTIVE NUMBERS ON VALVE CHART IDENTIFYING EACH INDIVIDUAL VALVE. ATTACH TAGS TO STEM OF VALVES WITH BRASS "S" HOOKS. PROVIDE ONE VALVE CHART MOUNTED IN EACH MECHANICAL ROOM & ONE COPY TO THE OWNER.

IDENTIFY ALL EQUIPMENT BY A PERMANENTLY ATTACHED MINIMUM 1-1/2" X 3-1/2" NAMEPLATE OF WHITE CORE LAMINATED BAKE LITE WITH BLACK SURFACE AND INCISED LETTERS. INCLUDE THE EQUIPMENT IDENTIFICATION NUMBER, VOLTAGE, PHASE, ELECTRICAL PANEL DESIGNATION AND CIRCUIT NUMBER.

DUCTWORK

REFER TO "HVAC DUCT MATERIAL" SCHEDULE, FOR DUCT MATERIALS PER APPLICATION.

DUCT CONSTRUCTION, INCLUDING SHEET METAL THICKNESSES, SEAM AND JOINT CONSTRUCTION, REINFORCEMENTS, ELBOWS, TURNING VANES, AND HANGERS AND SUPPORTS, SHALL COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" LATEST EDITION, AND PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA BASED ON PRESSURE & LEAKAGE CLASSES INDICATED IN THE "DUCT PRESSURE CLASS" SCHEDULE; UNLESS OTHERWISE NOTED.
ROUND DUCTWORK SHALL BE SPIRAL SEAM.
MINIMUM DUCT SHEET METAL THICKNESS SHALL BE 24 GAUGE.

LEAKAGE CLASS:
ROUND SUPPLY-AIR DUCT: 3 CFM/100 SQ. FT. AT 1-INCH WG.
FLAT-OVAL SUPPLY-AIR DUCT: 3 CFM/100 SQ. FT. AT 1-INCH WG.
RECTANGULAR SUPPLY-AIR DUCT: 6 CFM/100 SQ. FT. AT 1-INCH WG.
FLEXIBLE SUPPLY-AIR DUCT: 6 CFM/100 SQ. FT. AT 1-INCH WG.

DUCT ACCESS DOORS SHALL BE CONSTRUCTED OF DOUBLE WALL OF THE SAME OR GREATER GAUGE AS DUCTWORK. PROVIDE INSULATED ACCESS DOORS FOR INSULATED DUCTWORK. GASKET ALL EDGES AIRTIGHT, SIZE ACCESS DOORS TO PERMIT MAINTENANCE. MINIMUM SIZE 15" x 15" OR AS LARGE AS AVAILABLE DUCT SPACE WILL ALLOW, ACCESS DOORS LESS THAN 12 INCHES SQUARE: NO HINGES AND TWO SASH LOCKS, ACCESS DOORS UP TO 18 INCHES SQUARE: TWO HINGES AND TWO SASH LOCKS.

WATER-BASED JOINT AND SEAM SEALANT; APPLICATION BRUSH ON, SYNTHETIC RUBBER RESIN BASE, SOLVENT: TOLUENE AND HEPTANE, SOLIDS CONTENT: MINIMUM 60 PERCENT, SHORE A HARDNESS: MINIMUM 60, WATER RESISTANT, MOLD AND MILDEW RESISTANT, VOC: MAXIMUM 395 G/L., MAXIMUM STATIC-PRESSURE CLASS: 10-INCH WG, POSITIVE OR NEGATIVE, SERVICE: INDOOR OR OUTDOOR. SUBSTRATE: COMPATIBLE WITH GALVANIZED SHEET STEEL (BOTH PVC COATED AND BARE), STAINLESS STEEL, OR ALUMINUM SHEETS.

FLANGED JOINT SEALANT: COMPLY WITH ASTM C 920,; GENERAL: SINGLE-COMPONENT, ACID-CURING, SILICONE, ELASTOMERIC, TYPE: S, GRADE: NS, CLASS: 25, USE: O.

FLANGE GASKETS: BUTYL RUBBER, NEOPRENE, OR EPDM POLYMER WITH POLYISOBUTYLENE PLASTICIZER.

MAKE CONNECTIONS TO EQUIPMENT WITH FLEXIBLE CONNECTORS OF FLAME-RETARDANT OR NONCOMBUSTIBLE FABRICS. MANUFACTURERS; DUCTMATE INDUSTRIES, INC., DURO DYNE INC.,VENTFABRICS, INC.,WARD INDUSTRIES, INC., A DIVISION OF HART & COOLEY, INC.

VOLUME DAMPERS-GALVANIZED STEEL, PER SMACNA HVAC DUCT CONSTRUCTION STANDARDS, LATEST EDITION, PROVIDE AXLES FULL LENGTH OF DAMPER BLADES AND BEARINGS AT BOTH ENDS OF OPERATING SHAFT.

SEAL OPENING AROUND DUCTS THROUGH WALLS WITH MINERAL WOOL OR OTHER NON-COMBUSTIBLE MATERIAL.

SEAL ALL PENETRATIONS THROUGH FIRE SEPARATION WITH AN APPROVED UL LISTED ASSEMBLY AND FIRE STOPPING MATERIALS.

CONSTRUCT FLEXIBLE CONNECTIONS OF NEOPRENE-COATED FLAMEPROOF FABRIC CRIMPED INTO DUCT FLANGES FOR ATTACHMENT TO DUCT AND EQUIPMENT.

FLEXIBLE DUCT SHALL BE CONSTRUCTED OF TWO-PLY LAMINATE MECHANICALLY CORRUGATED BONDED ALUMINUM INNER CORE COVERED BY ONE INCH THICK FIBERGLASS INSULATION OF ONE POUND DENSITY, FIBERGLASS SHALL BE COVERED WITH A 2.5 MIL POLYETHYLENE VAPOR BARRIER. FLEXIBLE DUCT SHALL MEET THE LATEST REQUIREMENTS OF UL STANDARD 181, CLASS 1, FLEXIBLE AIR DUCT. DUCT TO BE RATED FOR 10 INCHES POSITIVE OR NEGATIVE PRESSURE., MANUFACTURERS; FLEXMASTER U.S.A., INC., MCGILL AIRFLOW LLC., WARD INDUSTRIES, INC.; A DIVISION OF HART & COOLEY, INC.

DUCT LINING

REFER TO "HVAC DUCT INSULATION" SCHEDULE FOR APPLICATIONS & VALUES.

FIBROUS-GLASS DUCT LINER: COMPLY WITH ASTM C 1071, NFPA 90A, OR NFPA 90B; AND WITH NAIMA AH124, "FIBROUS GLASS DUCT LINER STANDARD."

MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: CERTAINTEED CORPORATION INSULATION GROUP, JOHNS MANVILLE, OWENS CORNING.

MAXIMUM THERMAL CONDUCTIVITY: TYPE II, RIGID: 0.23 BTU x IN./H X SQ. FT., x ° F AT 75 °F MEAN TEMPERATURE.

WATER-BASED LINER ADHESIVE: COMPLY WITH NFPA 90A OR NFPA 90B AND WITH ASTM C 916.

INSULATION PINS AND WASHERS: CUPPED-HEAD, CAPACITOR-DISCHARGE-WELD PINS: COPPER- OR ZINC-COATED STEEL PIN, FULLY ANNEALED FOR CAPACITOR-DISCHARGE WELDING, 0.135-INCH- DIAMETER SHANK, LENGTH TO SUIT DEPTH OF INSULATION INDICATED WITH INTEGRAL 1-1/2-INCH GALVANIZED CARBON-STEEL WASHER.

DUCT INSULATION

REFER TO "HVAC DUCT INSULATION" SCHEDULE FOR APPLICATIONS & VALUES.
COMPLY WITH THE REQUIREMENTS OF ASHRAE 90.1 2010.
PRODUCTS SHALL NOT CONTAIN ASBESTOS, LEAD, MERCURY, OR MERCURY COMPOUNDS.
ACCEPTABLE MANUFACTURERS INCLUDE: CERTAINTEED CORP.; COMMERCIAL BOARD,, FIBREX INSULATIONS INC.; FBX., JOHNS MANVILLE; 800 SERIES SPIN-GLAS., KNAUF INSULATION; INSULATION BOARD,, MANSON INSULATION INC.; AK BOARD,, OWENS CORNING;, FIBERGLAS 700 SERIES.

PIPING, FITTINGS & PIPING ACCESSORIES

REFER TO "HVAC PIPING/TUBING MATERIAL, JOINTS & FITTINGS" SCHEDULE FOR PIPE MATERIALS, APPLICATION, RATINGS & FITTINGS.

DIELECTRIC FITTINGS; MANUFACTURERS, HART INDUSTRIES INTERNATIONAL, INC., WATTS REGULATOR CO.; A DIVISION OF WATTS WATER TECHNOLOGIES, INC
DESCRIPTION: COMBINATION FITTING OF COPPER-ALLOY AND FERROUS MATERIALS WITH THREADED, SOLDER-JOINT, PLAIN, OR WELD-NECK END CONNECTIONS THAT MATCH PIPING SYSTEM MATERIALS.
INSULATING MATERIAL: SUITABLE FOR SYSTEM FLUID, PRESSURE, AND TEMPERATURE.
DIELECTRIC UNIONS: FACTORY-FABRICATED UNION ASSEMBLY, FOR 250-PSIG MINIMUM WORKING PRESSURE AT 180 DEG F.
DIELECTRIC FLANGES: FACTORY-FABRICATED COMPANION-FLANGE ASSEMBLY, FOR 150- OR 300-PSIG MINIMUM WORKING PRESSURE AS REQUIRED TO SUIT SYSTEM PRESSURES.
DIELECTRIC COUPLINGS: GALVANIZED-STEEL COUPLING WITH INERT AND NONCORROSIVE THERMOPLASTIC LINING; THREADED ENDS; AND 300-PSIG MINIMUM WORKING PRESSURE AT 225°F.

PIPE JOINT CONSTRUCTION
REAM ENDS OF PIPES AND TUBES AND REMOVE BURRS. BEVEL PLAIN ENDS OF STEEL PIPE. REMOVE SCALE, SLAG, DIRT, AND DEBRIS FROM INSIDE AND OUTSIDE OF PIPE AND FITTINGS BEFORE ASSEMBLY.
SOLDERED JOINTS: APPLY ASTM B 813, WATER-FLUSHABLE FLUX, UNLESS OTHERWISE INDICATED, TO TUBE END. CONSTRUCT JOINTS ACCORDING TO ASTM B 828 OR CDA'S "COPPER TUBE HANDBOOK," USING LEAD-FREE SOLDER ALLOY COMPLYING WITH ASTM B 32.
BRAZED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS'S "BRAZING HANDBOOK," "PIPE AND TUBE" CHAPTER, USING COPPER-PHOSPHORUS BRAZING FILLER METAL COMPLYING WITH AWS A5.8.
THREADED JOINTS: THREAD PIPE WITH TAPERED PIPE THREADS ACCORDING TO ASME B1.20.1. CUT THREADS FULL AND CLEAN USING SHARP DIES. REAM THREADED PIPE ENDS TO REMOVE BURRS AND RESTORE FULL ID. JOIN PIPE FITTINGS AND VALVES AS FOLLOWS:
APPLY APPROPRIATE TAPE OR THREAD COMPOUND TO EXTERNAL PIPE THREADS UNLESS DRY SEAL THREADING IS SPECIFIED.
DAMAGED THREADS: DO NOT USE PIPE OR PIPE FITTINGS WITH THREADS THAT ARE CORRODED OR DAMAGED. DO NOT USE PIPE SECTIONS THAT HAVE CRACKED OR OPEN WELDS.
WELDED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS D10.12/D10.12M, USING QUALIFIED PROCESSES AND WELDING OPERATORS ACCORDING TO PART 1 "QUALITY ASSURANCE" ARTICLE.
FLANGED JOINTS: SELECT APPROPRIATE GASKET MATERIAL, SIZE, TYPE, AND THICKNESS FOR SERVICE APPLICATION. INSTALL GASKET CONCENTRICALLY POSITIONED. USE SUITABLE LUBRICANTS ON BOLT THREADS.

Y-PATTERN STRAINERS:
BODY: ASTM A 126, CLASS B, CAST IRON WITH BOLTED COVER AND BOTTOM DRAIN CONNECTION.
END CONNECTIONS: THREADED ENDS FOR NPS 2 AND SMALLER; FLANGED ENDS FOR NPS 2-1/2 AND LARGER.
STRAINER SCREEN: UP TO 3", 1/16" MESH. 4" AND ABOVE, 1/8" MESH STARTUP STRAINER, AND PERFORATED STAINLESS-STEEL BASKET WITH 50 PERCENT FREE AREA.
CWP RATING: 125 PSIG.

STAINLESS-STEEL BELLOW, FLEXIBLE CONNECTORS:
BODY: STAINLESS-STEEL BELLOWS WITH WOVEN, FLEXIBLE, BRONZE, WIRE-REINFORCING PROTECTIVE JACKET.
END CONNECTIONS: THREADED OR FLANGED TO MATCH EQUIPMENT CONNECTED.
PERFORMANCE: CAPABLE OF 3/4-INCH MISALIGNMENT.
CWP RATING: 150 PSIG.
MAXIMUM OPERATING TEMPERATURE: 250°F.

MANUAL AIR VENTS:
MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: AMTROL, INC., ARMSTRONG PUMPS, INC., BELL & GOSSETT DOMESTIC PUMP; A DIVISION OF ITT INDUSTRIES., TACO.
BODY: BRONZE
INTERNAL PARTS: NONFERROUS
OPERATOR: SCREWDRIVER OR THUMBSCREW
INLET CONNECTION: NPS 1/2., DISCHARGE CONNECTION: NPS 1/8., CWP
RATING: 150 PSIG.
MAXIMUM OPERATING TEMPERATURE: 225 °F.

AUTOMATIC AIR VENTS:
MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: AMTROL, INC., ARMSTRONG PUMPS, INC., BELL & GOSSETT DOMESTIC PUMP; A DIVISION OF ITT INDUSTRIES., TACO.
BODY: BRONZE OR CAST IRON
INTERNAL PARTS: NONFERROUS
OPERATOR: NONCORROSIVE METAL FLOAT
INLET CONNECTION: NPS 1/2., DISCHARGE CONNECTION: NPS 1/4., CWP
RATING: 150 PSIG.
MAXIMUM OPERATING TEMPERATURE: 240°F.

BLADDER-TYPE EXPANSION TANKS:
TANK: WELDED STEEL, RATED FOR 125-PSIG WORKING PRESSURE AND 375 DEG F MAXIMUM OPERATING TEMPERATURE. FACTORY TEST WITH TAPS FABRICATED AND SUPPORTS INSTALLED AND LABELED ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE: SECTION VIII, DIVISION 1.
BLADDER: SECURELY SEALED INTO TANK TO SEPARATE AIR CHARGE FROM SYSTEM WATER TO MAINTAIN REQUIRED EXPANSION CAPACITY.
AIR-CHARGE FITTINGS: SCHRADER VALVE, STAINLESS STEEL WITH EPDM SEATS.

IN-LINE AIR SEPARATORS:
TANK: ONE-PIECE CAST IRON WITH AN INTEGRAL WEIR CONSTRUCTED TO DECELERATE SYSTEM FLOW TO MAXIMIZE AIR SEPARATION.
MAXIMUM WORKING PRESSURE: UP TO 175 PSIG.
MAXIMUM OPERATING TEMPERATURE: UP TO 300°F.
SEPARATORS SHALL BE COALESCING TYPE, CENTRIFUGAL AND VORTEX TYPE ARE NOT ACCEPTABLE.

EXPANSION JOINTS, GUIDES & ANCHORS:
INSTALL MANUFACTURED, NONMETALLIC EXPANSION JOINTS ACCORDING TO FSA'S "TECHNICAL HANDBOOK: NON-METALLIC EXPANSION JOINTS AND FLEXIBLE PIPE CONNECTORS."
INSTALL EXPANSION JOINTS OF SIZES MATCHING SIZE OF PIPING IN WHICH THEY ARE INSTALLED.
INSTALL ALIGNMENT GUIDES TO ALLOW EXPANSION AND TO AVOID END-LOADING AND TORSIONAL STRESS.
INSTALL GUIDES ON PIPING ADJOINING PIPE EXPANSION FITTINGS AND LOOPS. ATTACH GUIDES TO PIPE AND SECURE TO BUILDING STRUCTURE.
INSTALL ANCHORS AT LOCATIONS TO PREVENT STRESSES FROM EXCEEDING THOSE PERMITTED BY ASME B31.9 AND TO PREVENT TRANSFER OF LOADING AND STRESSES TO CONNECTED EQUIPMENT.

PIPE HANGERS:
INSTALL THE FOLLOWING PIPE ATTACHMENTS:
ADJUSTABLE STEEL CLEVIS HANGERS FOR INDIVIDUAL HORIZONTAL PIPING LESS THAN 20 FEET LONG.
ADJUSTABLE ROLLER HANGERS AND SPRING HANGERS FOR INDIVIDUAL HORIZONTAL PIPING 20 FEET OR LONGER.
PIPE ROLLER: MSS SP-58, TYPE 44 FOR MULTIPLE HORIZONTAL PIPING 20 FEET OR LONGER, SUPPORTED ON A TRAPEZE.
SPRING HANGERS TO SUPPORT VERTICAL RUNS.
PROVIDE COPPER-CLAD HANGERS AND SUPPORTS FOR HANGERS AND SUPPORTS IN DIRECT CONTACT WITH COPPER PIPE.
INSTALL HANGERS FOR STEEL AND COPPER PIPING ACCORDING TO THE "PIPE HANGER DETAIL" HANGER SCHEDULE.

GENERAL DUTY VALVES

INSTALL SHUTOFF-DUTY VALVES AT EACH BRANCH CONNECTION TO SUPPLY MAINS, AND AT SUPPLY CONNECTION TO EACH PIECE OF EQUIPMENT.

INSTALL AUTOMATIC BALANCING VALVES IN THE RETURN PIPE OF EACH HEATING OR COOLING TERMINAL. BALANCING VALVES SHALL BE SIZED FOLLOWING THE MANUFACTURES REQUIREMENTS.

INSTALL VALVES WITH UNIONS OR FLANGES AT EACH PIECE OF EQUIPMENT ARRANGED TO ALLOW SERVICE, MAINTENANCE, AND EQUIPMENT REMOVAL WITHOUT SYSTEM SHUTDOWN.

LOCATE VALVES FOR EASY ACCESS AND PROVIDE SEPARATE SUPPORT WHERE NECESSARY.

INSTALL VALVES IN HORIZONTAL PIPING WITH STEM AT OR ABOVE CENTER OF PIPE.

INSTALL VALVES IN POSITION TO ALLOW FULL STEM MOVEMENT.

GENERAL REQUIREMENTS FOR VALVE APPLICATIONS, IF VALVE APPLICATIONS ARE NOT INDICATED, USE THE FOLLOWING:
BALANCING VALVE: USE BELL & GOSSETT CIRCUIT SETTER OR APPROVED EQUAL
IF VALVES WITH SPECIFIED SWP CLASSES OR CWP RATINGS ARE NOT AVAILABLE, THE SAME TYPES OF VALVES WITH HIGHER SWP CLASSES OR CWP RATINGS MAY BE SUBSTITUTED.
SELECT VALVES, EXCEPT WAFER TYPES, WITH THE FOLLOWING END CONNECTIONS:
FOR COPPER TUBING, NPS 2 AND SMALLER: THREADED OR SOLDERED ENDS WITH UNIONS.

CONTROL VALVES

PROVIDE FACTORY FABRICATED CONTROL VALVE OF TYPE, BODY MATERIAL AND PRESSURE CLASS REQUIRED FOR MAXIMUM PRESSURE AND TEMPERATURE RATING OF PIPING SYSTEM.

PROVIDE VALVES WHICH MATE AND MATCH MATERIAL OF CONNECTING PIPE UNLESS OTHERWISE INDICATED.

EQUIP VALVES WITH CONTROL MOTORS AND PROPER SHUT-OFF RATING FOR EACH INDIVIDUAL APPLICATION. CONTROL MOTORS TO BE 24 VOLT OR 120 VOLT AS SUITS THE APPLICATION.

PIPE INSULATION

REFER TO "HVAC PIPING/TUBING INSULATION" FOR APPLICATIONS & VALUES.
COMPLY WITH THE REQUIREMENTS OF ASHRAE 90.1 2010.
PRODUCTS SHALL NOT CONTAIN ASBESTOS, LEAD, MERCURY, OR MERCURY COMPOUNDS.
ACCEPTABLE MANUFACTURERS INCLUDE: JOHNS MANVILLE; MICRO-LOK., KNAUF INSULATION; 1000 PIPE INSULATION., MANSON INSULATION INC.; ALLEY-K ., OWENS CORNING;, FIBERGLAS PIPE INSULATION.

VIBRATION ISOLATION & SEISMIC CONTROL

PROVIDE VIBRATION ISOLATION DEVICES FOR ALL MECHANICAL EQUIPMENT FURNISHED UNDER THIS SECTION AS SUITS THE APPLICATION. REFER TO "HVAC VIBRATION-CONTROL SCHEDULE."

CLEANING, BALANCING AND ADJUSTMENT

THOROUGHLY CLEAN ALL NEW APPARATUS AND EQUIPMENT (AHUS, FANS, COILS, REPLACE FILTERS) PRIOR TO PLACING IN OPERATION. CALIBRATE COMPONENTS AND REPLACE FAULTY COMPONENTS AS REQUIRED.

AIR BALANCING SHALL BE PROVIDED UNDER THIS CONTRACT IN COMPLIANCE WITH THE BELOW. AIR BALANCING WORK SHALL BE PERFORMED BY AN INDEPENDENT NEEB CERTIFIED COMPANY, NOT ASSOCIATED WITH THE CONTRACTOR.

PROVIDE AIR READINGS BEFORE THE COMMENCEMENT OF WORK AS INDICATED ON THE CONTRACT DRAWINGS.

MARK EQUIPMENT SETTINGS, INCLUDING DAMPER CONTROL POSITIONS, DEVICES, TO SHOW FINAL SETTINGS AT COMPLETION OF BALANCING. PROVIDE MARKINGS WITH PAINT OR OTHER SUITABLE PERMANENT IDENTIFICATION MATERIALS.

TEST, ADJUST, AND BALANCE AIR DISTRIBUTION SYSTEMS TO PROVIDE AIR QUANTITIES INDICATED WITHIN PLUS 5 PERCENT.

SUBMIT A TEST REPORT INDICATING QUANTITY OF AIR AT EACH OUTLET AFTER BALANCING. LIST OBVIOUS NOISE AND AIR DRAFT PROBLEMS AND RECOMMENDED CORRECTIVE ACTION.

CUTTING, ALTERING AND PATCHING

PROVIDE ALL CUTTING, CHASING, DRILLING, ALTERING AND ROUGH PATCHING REQUIRED FOR THE WORK OF THIS DIVISION.

INCLUDING THE RESTORING OF EXISTING WORK CUT FOR OR DAMAGED BY INSTALLATION OF NEW WORK, AND WHERE PRESENT WORK IS REMOVED.

ALL MATERIALS AND WORKMANSHIP REQUIRED IN CONNECTION WITH CUTTING, ALTERING AND ROUGH PATCHING SHALL MATCH THE EXISTING WORK IN EVERY RESPECT.

DO ALL SHORING, BRACING, CUTTING, PATCHING, PIECING OUT, FILLING IN, REPAIRING AND REFINISHING OF ALL PRESENT WORK AS MADE NECESSARY BY THE ALTERATION AND THE INSTALLATION OF NEW WORK.

ALL HOLES AND OPENINGS OCCURRING IN THE EXISTING FLOORS AFTER EQUIPMENT, PARTITIONS, FLOORS, STEEL WORK, CONDUITS AND PIPES ARE REMOVED OR INSTALLED SHALL BE CLOSED UP WITH MATERIALS SIMILAR TO THE ADJACENT WORK.

THE SIZE AND LOCATION OF ITEMS REQUIRING AN OPENING, CHASE OR OTHER PROVISIONS TO RECEIVE IT SHALL BE GIVEN BY THE TRADE REQUIRING SAME IN AMPLE TIME TO AVOID UNDUE CUTTING OF ANY NEW WORK TO BE INSTALLED. THESE PROVISIONS SHALL NOT RELIEVE THE CONTRACTOR FROM KEEPING INFORMED AS TO THE REQUIRED OPENING, CHASES, ETC., NOR FROM RESPONSIBILITY FOR THE CORRECTNESS THEREOF, NOR FOR CUTTING AND REPAIRING AFTER THE NEW WORK IS IN PLACE.

INCLUDE ALL CUTTING, REPAIRING AND PATCHING IN CONNECTION WITH THE WORK THAT MAY BE REQUIRED TO MAKE THE SEVERAL PARTS COME TOGETHER PROPERLY AND FIT IT TO RECEIVE OR BE RECEIVED BY THE WORK OF OTHER TRADES, AS SHOWN ON THE DRAWINGS AND/OR SPECIFIED, OR REASONABLY IMPLIED BY THE DRAWINGS AND SPECIFICATIONS.

ALL REPAIRING, PATCHING, PIECING-OUT, FILLING-IN, RESTORING AND REFINISHING SHALL BE NEATLY DONE BY MECHANICS SKILLED IN THEIR TRADE TO LEAVE SAME IN CONDITION SATISFACTORY TO THE OWNER.

MATERIALS AND THEIR METHODS OF APPLICATION FOR PATCHING SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF THE SPECIFICATIONS.

MATERIALS AND WORKMANSHIP NOT COVERED BY THE SPECIFICATIONS AND ITEMS OF WORK EXPOSED TO VIEW ADJOINING EXISTING WORK, TO REMAIN SHALL; CONFORM TO SIMILAR MATERIALS AND WORKMANSHIP EXISTING IN OR ADJACENT TO THE SPACES TO BE ALTERED.

CUTTING, REPAIRING AND PATCHING SHALL INCLUDE ALL ITEMS SHOWN ON THE DRAWINGS, SPECIFIED IN THE SPECIFICATIONS OR REQUIRED BY THE INSTALLATION OF NEW WORK OR THE REMOVAL OF EXISTING WORK.

REMOVE PARTITIONS, WALLS, SUSPENDED CEILINGS, ETC., AS NECESSARY TO PERFORM THE REQUIRED ALTERATIONS OR NEW CONSTRUCTION WORK.

AVOID DAMAGE TO CONSTRUCTION AND FINISHES THAT ARE TO REMAIN.

PROTECT AND BE RESPONSIBLE FOR THE EXISTING BUILDING, FACILITIES AND IMPROVEMENTS.

ANY DISTURBANCE OR DAMAGE TO THE WORK, THE EXISTING BUILDING, AND IMPROVEMENTS, OR ANY IMPAIRMENTS OF FACILITIES RESULTING FROM THE CONSTRUCTION OPERATIONS, SHALL BE PROMPTLY RECTIFIED, WITH THE DISTURBED, DAMAGED, OR IMPAIRED WORK, RESTORED, REPAIRED OR REPLACED AT NO EXTRA COST.

ALL ALTERATIONS WHICH ARE NOT INDICATED ON THE DRAWINGS NOR SPECIFIED HEREIN BUT NECESSARY TO MAKE GOOD EXISTING WORK DISTURBED BY REASON OF THE WORK SHALL BE RESTORED TO A CONDITION SATISFACTORY TO THE OWNER.

ALL HOLES IN MASONRY FLOORS AND WALLS ARE TO BE CORE DRILLED.

DISTURBED CONCRETE AND /OR CEMENT FLOOR AREAS SHALL BE PATCHED WITH APPROVED TYPE LATEX MORTAR.

WHEN CEMENT MORTAR IS USED FOR PATCHING, THE SURFACES SHALL BE DEPRESSED A MINIMUM DEPTH OF 1".

TEMPORARY OPENINGS

ALL TEMPORARY OPENINGS CUT IN WALLS, FLOORS OR CEILINGS FOR PIPE OR DUCTWORK SHALL BE CLOSED OFF WITH TRANSITE OR AN EQUALLY NON-COMBUSTIBLE MATERIAL EXCEPT WHEN MECHANICS ARE ACTUALLY WORKING AT THE PARTICULAR OPENING.

SHUTDOWN OF EXISTING BUILDING SYSTEMS

DO NOT INTERRUPT EXISTING SERVICES OR SYSTEMS IN THE BUILDING UNLESS ABSOLUTELY NECESSARY. SUCH INTERRUPTIONS AND INTERFERENCES MUST BE MADE AS BRIEF AS POSSIBLE AND ONLY AFTER COORDINATION WITH THE OWNER. THE OWNER REQUIRES A MINIMUM OF SEVEN (7) DAYS NOTICE. OBTAIN PRIOR PERMISSION, IN WRITING.

WHERE THE WORK MAKES TEMPORARY INTERRUPTIONS UNAVOIDABLE, THEY SHALL BE MADE DURING OFF HOURS OR AS OTHERWISE DIRECTED BY THE OWNER.

ARRANGE TO WORK CONTINUOUSLY, INCLUDING OVERTIME, IF REQUIRED, TO ASSURE THAT SYSTEMS WILL SHUT DOWN ONLY DURING THE TIME ACTUALLY REQUIRED TO MAKE THE NECESSARY CONNECTIONS TO EXISTING WORK.

ELECTRICAL WORK

ELECTRICAL POWER SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR,

CONTROL WIRING SHALL BE BY THE HVAC CONTRACTOR, CONTROL WIRING SHALL BE DEFINED AS ANY 12V, 24V OR 120V WIRING INSTALLED FOR PURPOSED OTHER THAN PROVIDING PRIMARY ELECTRICAL POWER TO EQUIPMENT.

EXECUTION

THE PLANS AND SPECIFICATIONS ARE INTENDED TO PROVIDE A GENERAL SCOPE OF WORK.

WORK COORDINATION AND JOB OPERATIONS. THE MECHANICAL CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER TRADES, PROVIDING TIMELY INFORMATION ON HIS NEEDS AND RESPOND IN A TIMELY MANNER TO REQUESTS BY OTHERS.

MATERIALS AND WORKMANSHIP: ALL MATERIALS SHALL BE NEW AND WITHOUT DAMAGED PARTS. ALL WORK SHALL BE ACCOMPLISHED BY WORKMEN TRAINED IN THAT PARTICULAR FUNCTION OR TASK.

PROTECTION AND CLEANUP: ALL MATERIALS SHALL BE SUITABLY STORED DURING CONSTRUCTION TO PREVENT DAMAGE AND/OR DETERIORATION. KEEP THE SITE CLEAN OF DEBRIS DUE TO THESE OPERATIONS. CAP/SEAL OR OTHERWISE PROTECT PIPING AND DUCTWORK FROM FOREIGN MATERIAL DURING CONSTRUCTION. AIR FILTERS UPSTREAM OF COILS SHALL BE CHANGED REGULARLY TO PREVENT BUILDUP OF MATERIAL ON COIL. FILTERS SHALL BE CHANGED AT LEAST WEEKLY OR WHEN FULLY LOADED.

SYSTEM STARTUP AND OPERATION: PROVIDE ALL LABOR, MATERIALS, AND EQUIPMENT TO PLACE THE HVAC SYSTEMS INTO OPERATION. MAINTAIN OPERATION DURING BALANCING AND INSTRUCTION PERIODS. INSURE ALL EQUIPMENT IS RUNNING PROPERLY WITH PROPER LUBRICATION, WITHOUT EXCESSIVE VIBRATION, AND PROPER ELECTRICAL CHARACTERISTICS. PROVIDE OWNER WITH ANY MANUALS, AIR BALANCE REPORTS PRODUCT MAINTENANCE SPECIFICATIONS, BROCHURES AND/OR DRAWINGS NEEDED FOR THE OPERATION AND MAINTENANCE OF NEW EQUIPMENT.

WARRANTY

THE CONTRACTOR SHALL WARRANTY ALL WORK FOR A PERIOD OF 12 MONTHS FROM ACCEPTANCE BY OWNER. DURING THIS WARRANTY PERIOD, CONTRACTOR SHALL RESPOND TO ALL CALLS FOR SERVICE, REPAIRS AND ADJUSTMENTS REQUIRED BY OWNER. CONTRACTOR SHALL INSTALL REPLACEMENT PARTS AND MATERIAL REQUIRED AT NO COST TO THE OWNER. ALL EQUIPMENT WARRANTIES SHALL BE TRANSFERRED TO OWNER AND SERVICED BY CONTRACTOR AS PART OF THIS CONTRACT.

Central Connecticut State University
1615 Stanley Street
New Britain, CT 06050

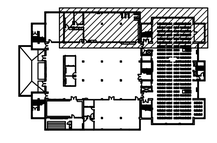
OakPark Architects LLC
312 Park Rd, W. Hartford, CT (860)232-6664

KOHLER RONAN, LLC CONSULTING ENGINEERS
93 Lake Avenue, Danbury, CT 06810
203.778.1017 F 203.778.1018
171 Madison Avenue,
New York, NY 10016
212.695.2422 F 212.695.2423
www.kohlerronan.com
E-mail krce@kohlerronan.com

REVISIONS

NUMBER	DATE	DESCRIPTION

MEDIA CENTER RELOCATION TO ELIHU BURRITT LIBRARY



KEY PLAN
NOT TO SCALE

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CCSU PROJECT No.:	22-87
DPW PROJECT No.:	BI-RC-397
DRAWN BY:	FMD
DATE:	6/14/2016
CAD FILE:	

SPECIFICATIONS-MECHANICAL

BUILDING No.:	DRAWING No.:
22	M-401